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DEC draws net lines

Sketches future direction while sweeping at IBM

BY ELISABETH HORWITT
CW STAFF

GLEN COVE, N.Y. — Under cross fire from consultants last week, Digital Equipment Corp. stuck to its "Digital has it now" guns. But company officials also hinted at future announcements that would further differentiate DEC's distributed networking strategy from IBM's.

At a two-day conference held here, DEC speakers emphasized that the company already offers most of the distributed computing and network management features that IBM recently announced and that will not be shipping for six to 18 months.

"DEC's best kept secret is that we already have network management products like IBM's introductions. It's an apples-to-apples comparison," said William Johnson, vice-president of distributed systems in DEC's Engineering and Manufacturing Division.

However, Johnson drew sharp distinctions between IBM's "hierarchical terminal-to-

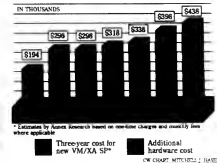
host network management" and DEC's distributed system, in which intelligent nodes constantly apprise each other of changes in network configurations and can dynamically re-route transmissions based on those changes.

Earlier this month, IBM announced Network Release 2, which permits network management to be distributed across multiple IBM 9370 systems. The 9370s can act as unattended network management nodes that pass network alerts up to a central Networkhost.

Continued on page 12

Adding it all up

Running multiple guests under IBM's VM/XA SP requires hardware which can be nearly as costly as the software. Full story page 6.



Apollo to add 4-MIPS machines

BY ROSEMARY HAMILTON
CW STAFF

CHIELSFORD, Mass. — Apollo Computer, Inc. will fill in the mid-range of its product line today with the announcement of the Series 4000, workstations

that reportedly will process information at a speed of 4 million instructions per second.

In addition to the Series 4000, Apollo is scheduled to introduce software-based personal computer integration tools, the company confirmed last week. Apollo will add models to its low-end Series 3000 as well as trim prices on current Series 3000 systems.

This introduction comes two weeks after Digital Equipment Corp. workstation announcements and one week before a scheduled product rollout from Sun Microsystems, Inc.

According to analysts, intensified competition in the workstation arena continues to blur the distinction between product lines. At least one analyst said he expects that, as a result, these vendors will focus more on networking capabilities than on hardware in an effort to keep ahead of the competition.

"Networking will be the battleground as their systems become commodities," said Vicki Brown, an analyst with International Data Corp. in Framingham, Mass.

DEC, for instance, recently *Continued on page 4*

Microsoft to pull 3Com into OS/2 LAN strategy

BY PATRICIA KEEFE
CW STAFF

NEW YORK — 3Com Corp. and Microsoft Corp. are expected to announce an agreement tomorrow to jointly develop and market Microsoft's OS/2 LAN Manager.

Under the development pact, tasks will be divided between the two companies, with 3Com writing some extensions to the LAN Manager, according to a document seen by *Computerworld*. Those extensions "could allow 3Com to build in 3+ Mail and internetworking," said Richard

Kimball, an analyst with San Francisco-based Montgomery Securities. 3+ Mail is 3Com's electronic mail package.

The two companies confirmed that a joint announcement is scheduled for tomorrow. The LAN Manager succeeds Microsoft's MS-Net, a set of networking protocols that forms the basis of network software such as 3Com's 3+ and IBM's PC Network Program. The LAN Manager features transparent file and printer sharing, advanced user-security features and powerful network administration tools. It is expected to ship when Microsoft's MS OS/2 ships early next year.

Analysts said the alliance is calculated to topple rival Novell, Inc. as the market leader in the network software arena. "Microsoft is very concerned about Novell, so it makes sense that they would do something like *Continued on page 101*

Uccel users still weighing merge impact

BY JAMES A. MARTIN
CW STAFF

NEW ORLEANS — Uccel Corp.'s customers seem to have adopted a wait-and-see attitude regarding the level of support and enhancements Uccel products will receive after the company merges with Computer Associates International, Inc.

During Uccel's annual meeting last week, several users said that, although they are still somewhat concerned about Computer Associates' commit-

ment to supporting Uccel products, Computer Associates deserves the benefit of the doubt, and the merger should be supported unless serious problems arise.

However, a few members of Tex U's 7, a Texas-based Uccel UCC7 users group, met with U.S. Department of Justice attorneys at the Uccel conference here last week to air their concerns about the merger.

The primary fear among users is that the combined companies will create an unwieldy giant with a nonchalant, "take-a-number" attitude toward customer support.

In addition, some users fear the Computer Associates-Uccel combination will have the ability to effectively eliminate most, if not all, viable competition from *Continued on page 10*

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Yea or nay? IBM is banking on record year for microcomputer sales based on early acceptance of PS/2 line, but analysts and competitors do not see profit in orders that they say are not indicative of actual sales. Page 6.

Mac attack. Apple plunges into engineering, architecture and design with a display of more than 20 hardware and software products from developers for use on its Macintosh personal computer family at the A/E/C Systems '87 show. Page 101.

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STEPHEN KIELY
PRIME COMPUTER INC.

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NEWS

Bill moved to shun NSA

NBS would oversee unclassified data security

BY MITCH BETTS
A/STAFF

WASHINGTON, D.C. — The U.S. House of Representatives last week approved the Computer Security Act of 1987, a measure that transfers the power to establish security standards for unclassified information systems from the National Security Agency (NSA) to the National Bureau of Standards (NBS).

The legislation, which was approved on a voice vote, was sent to the Senate for action later this year.

The bill also requires federal DP managers to establish security plans and staff training programs for federal systems, containing sensitive information.

Under the measure, the NBS is authorized to "assist the private sector, upon request, in using and applying the results" of its computer security research programs.

Responds to two concerns
Rep. Dan Glickman (D-Kan.) said the bill responds to two major congressional concerns: numerous audits showing that federal systems lack adequate security controls and a 1984

presidential directive that gave the NSA the lead role in setting the government's computer security policies.

National Security Decision Directive (NSDD) 145 gave the NSA authority over computer security in both classified and unclassified information systems, which provoked a controversy over military control of government and commercial information (CW, July 8, 1985).

Give the NBS authority

The House legislation would roll back part of NSDD 145 by giving the NBS authority over unclassified systems and leaving the National Security Agency with power over classified systems.

In a compromise with the Reagan administration, the House bill states that NBS should draw upon the National Security Agency's technical expertise where appropriate.

The House bill also establishes a 12-member Computer Systems Security and Privacy Board within the Department of Commerce. The board, with federal DP managers and other DP experts as members, would identify emerging security issues and advise the NBS.

Computer vision ports Medusa to Sun platform

BEDFORD, Mass. — ComputerVision Corp. has ported its Medusa computer-aided design (CAD) software, written for Digital Equipment Corp. VAX hardware, to the Sun Microsystems, Inc. platform.

The Medusa workstations start at \$17,000 and are available now, the vendor announced last week.

A year ago, ComputerVision took its first step into the workstation arena by porting its flagship product, Caddis 4X, from proprietary hardware to the Sun platform.

For users not ready for 3-D
With both products now running on workstations, the vendor is targeting the Medusa version at smaller companies that are "not quite ready to jump into the 3-D world," a ComputerVision spokesman said. The Caddis 4X workstation, meanwhile, remains the system "for those looking to automate their entire process," he added.

According to the spokesman, the two software packages have different approaches to CAD: Medusa's core is a two-dimensional drafting package, while the basis of Caddis 4X is a three-

dimensional wire-frame modeling tool.

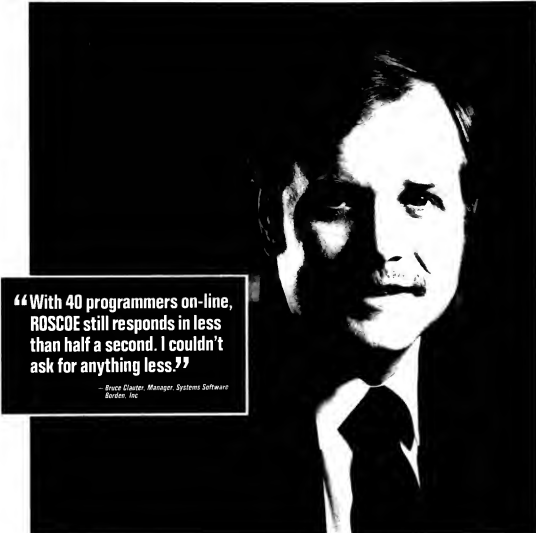
Medusa will run under the Sun version of Unix and is currently available on Sun3 hardware, which is based on the Motorola, Inc. 68020 microprocessor. ComputerVision said it plans to offer the software on future Sun systems as well.

The company spokesman said ComputerVision plans to add unbundled versions of Medusa on a limited basis. "This is not an across-the-board situation," he said.

The entry-level Medusa workstation is based on Sun's low-end 3/50 monochrome system and includes the Medusa core package, 2-D Drafting. Additional Medusa modules can be purchased separately. The 3-D Design module, for instance, costs \$15,000.

The high-end Medusa offering uses the Sun 3/260. With 2-D Drafting, it sells for \$67,500. The 2-D Drafting package will be offered to certain customers separately for \$5,000 a license, the spokesman added.

Medusa was developed by CIS Ltd. in Cambridge, England, now a subsidiary of ComputerVision.



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*— Bruce Clauser, Manager, Systems Software
Borden, Inc.*

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Timeplex switches on T1 plan

BY ALAN ALPER
NEW STAFF

NEW YORK — Moving to stake out turf in the high end of the T1 networking market, Timeplex, Inc. last week unveiled a top-of-the-line switch with 144-line capability and a centrally controlled network management system with a bridge to IBM's Netview.

The product introductions, made at a press conference here, were part of a carefully orchestrated attempt by Woodcliff Lake, N.J.-based Timeplex to articulate its networking strategy and position itself as a technology leader, particularly in the aftermath of computer network equipment. Technologies Corp.'s OEM agreement with IBM (CW, June 22).

Crucial to that strategy was Timeplex's disclosure of its Systems Connectivity Architecture (SCA), the firm's "open" approach to linking voice, data and image processing systems over hybrid networks and for centrally managing these sometimes disparate and geographically dispersed components.

Joint planning

SCA, the firm said, defines rules for interaction between public and private networks in local- and wide-area environments. Timeplex, while offering little substance in explaining the architecture, said it intends to use SCA to help sell its products.

"It's a framework for joint planning with our customers," noted John Eddon, Timeplex's

corporate vice-president of marketing. "We're looking to share our view of technological direction and standards which will determine the issues in their management decision making."

Timeplex said its high-end

A stronger link

Timeplex's Link/100 offers greater flexibility than the older Link/2

Features	Link/100	Link/2
Number of T1 lines	144	30
Number of ports	18,000	300
Architecture	Distributed	Single-site node
Instructions	Downloadable	Cast in firmware
Control point	NTS	Static

(CW, 11/89)

Link/100 offers up to 144 T1 links, supports up to 15,000 I/O channels and is fully compatible with the firm's Link family of network resource managers.

The product's dual-layer architecture reportedly allows users to distribute T1 and I/O capacity rather than concentrate all channels and cables in one physical place. A hub layer, interconnected with fiber-optic links, supports T1 lines with up to six meshed hubs, while the I/O layer, which supports a multiplicity of data interfaces and voice communications, can be distributed within a 7-kilometer radius of the hub.

The base-level price of Link/100 is \$100,000 and can extend as high as \$850,000 when fully configured, Timeplex

said. Initial availability of the switch with full I/O channel support is slated for October, the firm said, although its extensive T1 support will not be available until next spring.

"If they can deliver what they

said in the time they said, this product will hurt a lot of people," noted Rich Villars, an analyst with market research firm International Data Corp. (IDC) in Framingham, Mass. "This announcement positions Timeplex at the high end of the market and will force the competition to respond."

Because of the phased-in availability of the product and the attractiveness of the distributed architecture, Villars said, he feels the announcement may cause customers to stop purchasing T1 switches for several months until the significance of Link/100 is fully understood.

Timeplex, the firm's central-end network manager, allows integration of all Timeplex and non-Timeplex equipment and

provides for compatibility with host-based management systems such as Netview. Timeplex was designed to distribute control of network management throughout the network based on geography, function and equipment type. It consists of a central controller — based on a Hewlett-Packard Co. 9000 microcomputer — and one or more regional controllers, which use an Intel Corp. 80286-based microcomputer as a hardware platform.

The product's capabilities include monitoring and alarms; network, segment and node status; trouble reports; topological and network configuration tools; and diagnostics.

No individual monitoring

Its bridge to Netview, an integrated version of Timeplex's Link/View, allows Timeplex to act as a hub for all network management, the vendor said. This eliminates the need for individual personal computers to monitor performance, as is required with IBM's approach.

"They don't have the capacity to define a standard like IBM, but what they're saying is that they like the standard and have made some adjustments to make it better," IDC's Villars said.

Timeplex's regional and central controllers will be available in September and December, respectively, the firm said. Software for the regional controller is priced at \$25,000; software for the central controller costs \$30,000. Customers have the choice of either purchasing and servicing the hardware portion of the controllers directly from the manufacturers or through Timeplex.

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Computerworld is a publication of DEC Corporation

and is published weekly except for two issues

combined annually in November and December

Subscription rates: \$12.00 per year in advance

Single copies: \$2.00 each

Advertising rates: \$100 per line per week

Printed in the U.S.A.

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POSTMASTER: Send address changes to

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MA 01581

Second-class postage paid at Westborough, MA

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Postmaster: Please send address changes to

Computerworld, P.O. Box 1000, Westborough,

MA 01581

Subscription rates: \$12.00 per year in advance

Single copies: \$2.00 each

Advertising rates: \$100 per line per week

Printed in the U.S.A.

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Apollo

FROM PAGE 1

enhanced its Local Area Vax-cluster, and Apollo will be improving workstation-to-personal computer communications with today's introduction.

For next week's announcement, Sun sent out invitations carrying the slogan: "The Network is the Computer."

Apollo's new mid-range machine is an expected addition to its lineup, according to Mark Stahlman, an analyst with Sanford C. Bernstein & Co., a New York brokerage firm.

"Apollo currently has a strong high end and low end, but that combination has left them a little weak in the middle," Stahlman said.

He added that he expects the Series 4000, which Apollo has dubbed Personal Superworkstations, to be based on the Motorola, Inc. 68020 microprocessor with a 25-MHz clock speed. The vendor's current high-end turbo models are based on the 68020 with a 20-MHz clock speed.

The Series 4000 will reportedly include both desktop workstations and servers. With a 4 MIPS rating, the Series 4000 will surpass the vendor's high-end DS580 and DS590 Turbo models, which are rated at 3.5 MIPS.

But Apollo said the Turbo models are intended for more graphics-intensive applications that require three-dimensional modeling.

'Aggressive repricing'

While not confirming that it would follow DEC's lead and slash prices on low-end offerings, Apollo said it has planned "aggressive repricing" for the Series 3000.

However, IDC's Brown said she does not expect Apollo to cut its prices as drastically as DEC did earlier this month. "Apollo will never be as aggressive in pricing as the others," Brown said. "They will continue to go after the performance curve."

Apollo's new PC integration products are said to allow engineering workstation users easier access to PC applications

Apollo system goes on block in Allegis fund-raising bid

BY DAVID A. LUDLUM

CW STAFF

Shaken by several recent takeover attempts, the directors of United Airlines' parent company said they plan to raise money for the firm's stockholders by selling a stake in United's Apollo computer reservation system to a partner.

In a statement issued last week, the directors of the parent company, Allegis Corp., confirmed that the firm will sell its Hertz rental car and Hilton and Westin hotel units, and they announced the offer of a stake in Apollo, along with a shake-up of top management at United.

Analysts have estimated Apollo could be worth \$1 billion. The system is said to be second to American Airlines' Sabre system in regard to the share of reservations made by travel agents, with about 33%. Recently, Sa-

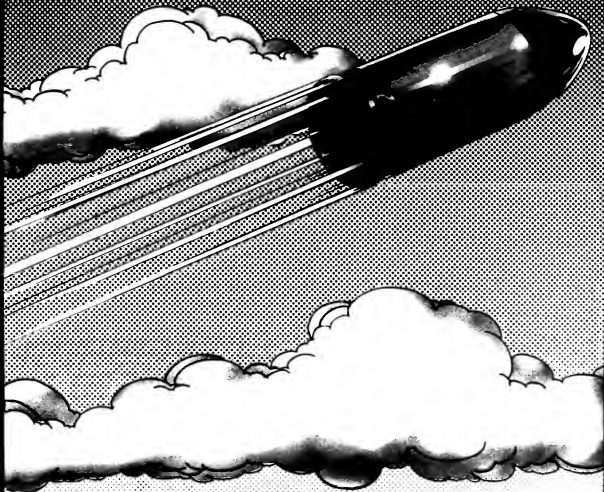
bre has generated more revenue for American than have airline operations. United does not break out Apollo's revenue.

The sales are intended to raise cash to distribute to stockholders. United spokesman Joe Hopkins said. This action would lessen the likelihood that stockholders would back a takeover attempt.

"Our parent company has been the target of takeover bids by several groups. The proceeds would go to shareholders as part of the company's plan to maximize short-term value," Hopkins said.

How large a portion of Apollo would be sold is subject to negotiation, Hopkins said. United hopes to move "expeditiously" in making a sale, he said.

USAir, which recently acquired Piedmont Aviation, has said it is seeking reservation services



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VM/XA SP key needs hardware

Multiple preferred-guest operating system feature adds to SP cost

BY JAMES CONNOLLY
OF STAFF

The broad-based appeal of a key feature in IBM's new VM/XA SP and its 3090 mainframes was questioned last week by industry observers who said most VM users are unlikely to pay up to \$200,000 for additional hardware to run multiple preferred-guest operating systems.

Analysts, a third-party software vendor and an IBM official said most VM users are more interested in Extended Architecture (XA) capabilities for IBM's Conversational Monitor System (CMS) and in other VM/XA SP features than they are in running four high-performance guests.

The preferred-guest capabilities, provided through VM/XASP and the Multiple High Performance Guest Support hardware upgrade, is seen by some observers as setting the 3090 apart from earlier IBM mainframes since it is available only on the 3090 E models that were announced in January.

Key selling point

Analyst Bob Durdjovic, president of Annex Research, Inc. in Phoenix, said the multiple preferred-guest facility may be what will drive observers and IBM customers have expected to distinguish 3090s from older 3080 mainframes.

It's certainly a key selling point from the functional differentiation standpoint. There were some things before, like

the vector facility, that you could only get on the 3090. But in terms of really making a difference, VM/XA clearly is it," Durdjovic said.

He also reported that the three-year cost of running VM/XA SP with the multiple preferred-guest facility ranges from \$194,429 for a 3090 Model 120E to \$437,929 for the high-end 3090 Model 600E. He estimated the three-year cost of the older VM/XA SP at \$163,376 for all models.

To take full advantage of VM/XA SP, a user reportedly must pay a minimum of \$80,000 for a hardware upgrade, which takes from seven to 12 hours and involves replacement of thermal conduction modules and channel cards. Upgrading additional CPUs in a configuration ranges in cost from \$20,000 to \$60,000. The upgrade for a six-CPU 3090 Model 600E costs \$200,000.

Durdjovic maintained that users are left with minimal benefit from VM/XA SP if they do not buy the hardware option.

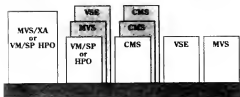
However, Steve Joselyn, program manager for end-user services at International Data Corp., a Framingham, Mass.-based research firm, noted that users get the advantage of 31-bit addressing for CMS and single-image processing for large systems, such as the 3084 and the

3090 Model 600E, without the hardware option.

"I don't think the typical VM situation is going to be one with multiple guests," added Romney White, president of VM/CMS Unlimited, Inc., a Boston-based software house. White said sup-

IBM's VM/XA

Under the older VM/XA SP, a single preferred guest had priority access to CPU cycles, under the new VM/XA SP, the first preferred guest (left) features higher availability, but the second, third- and fourth-preferred guests (second from left) have equal access to the CPU.



INFORMATION PROVIDED BY IBM

port for more users and larger CMS applications is of greater interest to VM users.

"I don't think there is any great bonus for everyone here, although it certainly is a way to put more money in IBM's pockets, which is good for IBM," White said. "I don't see any overwhelming reason to buy a 3090 in the face of the announcements. The multiple-guest part doesn't seem very exciting. It's better than what XA is today at running guests, but it is not clear to me that there's a great de-

mand for it."

An IBM official concurred. "I view it more as an option for those who really need it," said Larry Fall, market support administrator for data systems marketing in IBM's Information Systems Group. "There is not a massive need out there."

Only on E models

The option runs only on the E models, which also include an enhanced Start Interpreter Exe-

cutable that may be migrating from IBM's MVS to VM/XA with 80% of his work in the production MVS system and 20% of his work being tested for migration to VM/XA. As those applications are converted to VM/XA, the relative weight of 80% for MVS and 20% for XA starts to change, Fall said, noting that the user might run both sets of applications as high-performance guests during the transition period.

He said the multiple-guest feature could be important to users who are replacing several systems with one large machine, such as the 3090 Model 600E, and users who are consolidating data centers, such as in the case of a corporate merger.

Fall said one performance benefit he showed that past pricing ruling under the multiple preferred-guest feature could run at 88% to 98% of the performance of a comparable system on a dedicated CPU and that degradation was only 1% to 2% between the first preferred

guest and the fourth preferred guest. A nonpreferred guest runs at 50% to 70% of native-mode performance, and the single preferred guest running under VM/XA SP operates at 93% to 95% of native-mode performance, he added.

Fall said VM/XA SP users who pass up the multiple preferred-guest option still get the benefit of 31-bit addressing and better response times. Such users can also get single-image processing from systems as large as the 3090 Model 600E.

PS/2 defies storm of criticism as 250,000 ship

BY ED SANCHELL
OF STAFF

NEW YORK — Despite healthy skepticism from competitors and analysts that IBM could establish its Personal System/2 series as a standard IBM last week said it has shipped more than 250,000 of the machines in both large and small quantities.

At an analyst meeting held here, William Lowe, president of IBM's Entry Systems Division, said the company now has backlog orders for approximately 500,000 more PS/2s. He said the firm's production staff in its three manufacturing plants has been working "flat out" to meet demand.

Several analysts and users cautioned, however, that a portion of the backlog could come from post-shipment orders, or orders placed by users and dealers just for the sake of receiving volume discounts.

"Just because you order them doesn't always mean you are go-

ing to buy them," said Jeff Ehrlich, manager of product technology for General Electric Co. Ehrlich added that GE is committed to buying thousands of the systems during the next year.

Some analysts said IBM had called the meeting to combat recent speculation that sales of the PS/2 were sluggish and that sales of machines made by Compaq Computer Corp. and one or two other compatible makers were brisk during April and May.

Striking back

IBM was also striking back at the strong statements made recently by Compaq President Rod Canion, who said he does not see any compelling reason to copy IBM's Micro Channel architecture, which is used in three members of the PS/2 family.

Canion also said the architecture's proprietary nature only strengthens IBM's hold on its customers without providing any obvious advantages over the existing standard.

IBM said it expects to have a record year for sales of microcomputers based on the early acceptance of its PS/2 series in both small and large accounts. "There has been no finished-goods inventory at the end of each week. Orders continue to outstrip demand," Lowe said. He added that IBM is producing 2,000 PS/2 Model 30s per week and 400 Model 50s.

IMS America, Inc. recently released the results of a dealer survey of invoices that showed the PS/2 Model 30 was the most frequently requested system during the first month of its availability. Market research firm Infocorp in Cupertino, Calif., said PS/2 sales accounted for 15% of the market in April, although the Model 30 made up two-thirds of that amount.

"PS/2 sales have been strong, but the volume sales aren't coming yet because companies are still doing their evaluation," said Matt Frazzetta, a ComputerLand Corp. dealer in



IBM's Lowe

White Plains, N.Y. "We are selling everything we get."

Lowe announced that Delta Airlines last week placed a large order for PS/2 systems to go along with similar orders from competitors American Airlines and United Airlines. Lowe said sales for the first two quarters of this year were ahead of those for the same period last year and that he expects third-quarter sales to be even stronger.

IBM announced it will stop

producing all models of its Personal Computer XT in the next 60 to 90 days. While the company will continue making the PC AT 338, Lowe said he is consulting with customers and dealers to see how many more of the ATs they want. He said the company has not decided when it will stop producing the system.

No licensing plans

Asked about rumors of IBM talking to compatible makers about licensing its Micro Channel architecture, Lowe said the company has made no such overtures.

"Those that think we are licensing the Micro Channel have got to be kidding," Lowe asserted.

Lowe said IBM intends to protect its technology "to the full extent of the law." He said he believes compatible makers will have a much more difficult time copying the PS/2 series than the PC line because of the proprietary logic surrounding the processor and the fact that IBM is no longer using off-the-shelf components.

Cincom package aims to automate MVS centers

BY CHARLES BABCOCK
LAS VEGAS

CINCINNATI — Cincom Systems, Inc. joined a small group of software vendors attempting to automate data processing center operations with its introduction last week of Sys/Master for MVS.

Sys/Master reportedly intercepts and automatically filters the stream of messages sent to operator consoles by the MVS operating system. It can be pre-programmed to respond to routine messages, freeing system operators to concentrate on signs of trouble that require human intervention, said Cincom spokeswoman Victoria N. Duckworth.

In addition to filtering and responding to messages, Sys/Master can also be used to automate the operation of remote facilities, the vendor said.

'Incredibly important'

"That's incredibly important for IBM's 9370s. You can't afford to put a staff person out there for a \$60,000 box," said Walter R. Thomas, a Cincom technical consultant.

The \$30,000 product is scheduled to be available this fall. It can automate the operation of more than one CPU when used in conjunction with a second Cincom product, Net/Master, which can be purchased in \$10,000 modules, depending on functions desired, Cincom representatives said.

In a multiple-CPU arrangement, Sys/Master could be set up to reroute output to free tape drives on a second host rather than wait for drives to free up on the host to which the job was originally submitted. Without a decision to detach the drives from the second host and make them available to the first, the job would wait, Duckworth said.

In a simpler setting, Sys/Master would take its cue from messages filed by single MVS systems, which are the staple of systems operators. "MVS inundates you with messages," Duckworth noted. A demonstration screen tied to Cincom's 3084 showed blocks of messages rolling by as fast as the eye could perceive individual lines.

The messages that require operator attention are named in a selection table when Sys/Master is installed. Some messages, such as the notice that a job has abended, can be required to be displayed in red. Yellow messages could denote those that require some action. In the demonstration, the yellow messages turned to green as Sys/Master dispatched the correct response for the action required.

In addition to MVS, Sys/Master can be installed to handle messages from such MVS sub-

systems as IBM's CICS, TSO, JES and IMS/DC. A special feature allows an operator to request a synopsis of JES messages that every few minutes tells him what types of messages and how many of each have been received.

Sys/Master and Net/Master

are intended to compete with IBM's Netview family of products for system and network management.

Thomas said features that distinguish Cincom's products from Netview include the following:

- Changes to the selection tables

can be done on-line rather than taking the system down, as required with Netview.

- Operator consoles can be devoted to specific purposes, such as monitoring tape drives, rather than remaining as general-purpose devices.

- The products come with a tool

kit that includes a fourth generation language for writing commands to the system.

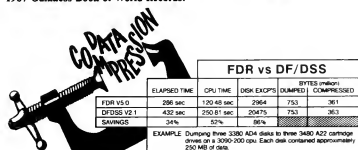
- Sys/Master responds to messages concurrently, dispatching responses without waiting for completion messages on previous commands.

"Problems come in waves. You have to deal with them as quickly as they come," Thomas noted.

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The long and winding road to CIM

Bridge between MIS and manufacturing remains shaky step on path to factory of future

BY ROSEMARY HAMILTON
A-10

CHICAGO — Computer-integrated manufacturing (CIM) is a distant goal for many manufacturers, and one of the major impediments is the strained relations between MIS and manufacturing departments, users and consultants said last week.

"Sometimes we work together, sometimes we don't," said Robert Marks, manager of manufacturing engineering at Gehl Co., a farm equipment manufacturer in West Bend, Wis. "We each, at times, think we're top dog."

Marks and other attendees at the Advanced Manufacturing Systems Exposition and Conference held here last week said their companies are taking steps to bridge the two worlds but added that they have a way to go before the two sides work together effectively.

Perry Grace, vice-president of management and information services at Morton Thiokol, Inc. in Chicago, said the peaceful coexistence of manufacturing us-

ers and MIS is an evolving process. "If you take any MIS or systems person, they may not have experience in a given function, such as manufacturing. But everyone has to start somewhere. You're not born with it," he added.

Interaction critical

Consultants said that beyond the technological challenges of CIM, the interaction between the two sides of the business is a critical problem. MIS, they said, needs to lend its expertise to factory automation.

Many manufacturers, however, resist MIS efforts to become involved because they believe MIS does not understand their jobs.

When asked what role MIS should play in his company's CIM effort, John Guldán, an engineering associate at Firestone Tire & Rubber Co., said, "It should be right where they are now — handling traditional DP. Let the shop floor applications stand with the people who understand these things."

Such opinions are pervasive in manufacturing, said James K

Burns, a partner at Arthur Andersen & Co.'s Management Information Consulting Division, based here.

"MIS needs to come on board, because their expertise is badly needed," Burns said. "Manufacturers don't have all the skills. Without the MIS disciplines, we'll have factories riddled with problems like maintenance."

Craig Monroe, a programmer analyst at Cummins Engine Co. in Columbus, Ind., agreed that friction exists between the two entities. As an MIS staffer, he said, he felt resistance from manufacturing when his department first became involved with factory automation two years ago.

"Right now, we're exposing to manufacturing what is possible. The second phase will be when they tell us what they want us to do," Monroe said.

One tactic for establishing freer relations is for MIS to show it understands the manufacturing process, Monroe added.

When a new system was installed in the past, MIS tended to work with the first shift of em-

ployees, a process that fit in with its work schedules, while the later manufacturing shifts were left on their own.

"Now, we try to help the off-shifts, too," Monroe said. "We have someone to babysit them at the beginning of a new project."

More than babysitting

But Arthur Andersen's Burns said MIS needs to do much more than babysit.

"Manufacturers are frustrated with them because they tend to bring old methodologies to the table," he said. "They see MIS as trying to control purchases and being caught up in rules and regulations. MIS has got to open their minds to a new world."

Users said this new world includes real-time factory devices, shop floor computers, robots and controllers — all of which are foreign to MIS.

In addition, "The languages they're used to use, what we need," Firestone's Guldán said. "In the real world now, it's Fortran and C, not Cobol."

Even in cases in which MIS is developing a deeper understanding of the manufacturing envi-

ronment, it still has a bad image among users, said M. R. Rangaswami, a senior consultant in the manufacturing services division of Deloitte Haskins & Sells in Woodland, Calif.

"Sometimes they've got to be more applications-oriented and show they know what these users want," he said. "The image of MIS now is that they tend to control things, that they have an attitude like, 'This is my database, which goes against the concept of CIM.'"

'Getting by' MIS

Arthur Andersen's Burns recalled a story of when one manufacturer introduced an industrial computer in 1976 but was quickly told by prospective customers that "it" would never get by MIS.

"They ended up calling it a programmable logic controller, which confused everyone, and manufacturing was able to buy it," Burns said.

It seems the controlling image will be difficult to shake. Gehl's Marks still recalls the two programmers he had working for him in the late 1960s. "They worked for me so we wouldn't have to on the DP schedule. But then there were questions raised, and they were assigned to DP. So we had to sit in line like everybody else," he said.

Top execs line up for peek at factory automation

BY PETER BARTOLIK
A-10

CHICAGO — MIS managers may be uninspired by computer-integrated manufacturing (CIM) as some observers claim, but top corporate officers apparently are eager to be shown the way to the factory of the future.

More than 150 officers bearing the titles of chairman, chief executive officer or chief operating officer reportedly signed up last week for private tours of a real-time integrated manufacturing environment demonstrated at the Advanced Manufacturing Systems Exposition and Conference here.

Furthermore, some 4,000 vice-presidents and directors of manufacturing companies were said to have signed up to tour the 24,000-sq-ft Impact '87 demonstration.

Open arms

According to James K. Burns, a member of the Big Eight accounting firm Arthur Andersen & Co. and managing partner for the Impact demonstration, top corporate executives are increasingly willing to embrace CIM technologies as they search for methods to increase productivity and efficiency.

"Their enthusiasm is very high; they know they have to deal with this as a management

issue," Burns said.

The Impact project combined automated design, machining, flexible machining, robotics and process manufacturing to produce navigational "black boxes" composed of circuit boards, mounting brackets and metal casings. Procedures integrated

Equipment Corp., Intergraph Corp., Tandem Computers, Inc. and Intel Corp.

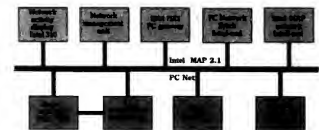
In the production management phase of the project, a DEC industrial VAX and an IBM 9370 both functioned as area controllers, receiving daily production schedules from an IBM 4381

tion 11 models exhibitor, noted that all included products were required to have been announced prior to the demonstration but about 60% of the products were relatively new to the market.

"A lot of people came in just to see the 9370," he said.

Impact '87

Production management area



INFORMATION PROVIDED BY ARTHUR ANDERSEN & CO.
C-10 EXHIBIT

into the system included order entry, remote-site job execution, production scheduling and final assembly.

Arthur Andersen served as systems integrator for the project and worked with 13 other vendors, including IBM, Digital

host connected to the Manufacturing Automation Protocol network by Intel's Fastpath link and passing along production control orders to manufacturing cells (see chart this page).

Burns, who began organizing the manufacturing demonstra-

The demonstration was designed to show that production systems can be crafted from existing products, Burns added.

We were working with state of the market as opposed to state of the art," he said. Design of the exhibit took two months, he said.

The CIM market has been the target of an aggressive push in the past two years by Arthur Andersen, which provides customers with MIS consulting services in addition to accounting services.

Burns said the firm's CIM division is "working with or talking to" about 150 of the Fortune 500 companies. He said probably 98% of the Fortune 500 have recognized the need to involve CIM, while possibly 25% have already activated or begun to install an entire production line based around CIM.

MIS knowledge needed

Burns said that to date most CIM projects have been instigated by engineering or manufacturing executives but that MIS inevitably will be greatly involved due to the enormous software requirements of CIM projects. He also said that MIS has the software maintenance and documentation skills required of such projects.

"MIS folks haven't got on top or caught up [with the CIM issue] as much as they should," he said. "That may be one reason why [CIM] hasn't caught on as fast as it should."

But whether or not MIS takes a lead role, Burns added, U.S. corporations appear to have made the strategic commitment to CIM and, he predicted, most would invest heavily in CIM production processes within the next two to four years.

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Uccel users

FROM PAGE 1

several markets, including disk and tape management systems and job schedulers in the IBM MVS environment.

"If this merger goes through, it would squash the competition in several software markets for at least four or five years, until someone could come up with a real competitive product," said Eugene W. K. Soo, staff systems programmer for Transco Energy Co. in Houston. Soo is one of the Tex Us 7 members asking the Justice Department to investigate the merger.

Soo said that with the Uccel merger, Computer Associates would own three tape management systems in the MVS environment and that "one or sever-

al of those will likely go by the wayside."

The Computer Associates-Uccel partnership is scheduled to be finalized Aug. 15, pending shareholder and regulatory approval.

In a keynote address at the Uccel conference, Computer Associates Chairman and Chief Executive Officer Charles B. Wang acknowledged users' concerns about support from his firm and said there is "always room for improvement."

"At Computer Associates, support and client satisfaction is our first priority, and let me assure you that we will make every effort to embrace, into our organization and procedures, those things which the Uccel support staff does better than Computer Associates," Wang said.

In addition, Wang stressed

that overlapping products resulting from previous Computer Associates mergers have continued to be supported, pointing to the company's Tape Label Management System, VS-Manager and CA-Jars as examples.

"In every case, there was a corresponding Computer Associates product at the time of acquisition, and yet we have continued the support and enhancement of the acquired product" as well as our own, Wang added.

The presence of the Justice Department at the users conference "should not wave any red flags," said an official who asked not to be identified.

The department typically talks to customers and competitors following the announcement of a planned merger, the official said, adding that there appears to be nothing extraordinary about the Computer Associates-Uccel marriage proposal and no foundation for an antitrust case.

However, the official stressed, only preliminary research has been undertaken in the matter.

The Tex Us 7 users group members are not seeking a complete federal blocking of the merger but would like the Justice Department and the Federal Trade Commission to consider mandating that the merged company divest itself of overlapping products, said Randy Fowlkes, a systems programmer for American General Life & Accident Insurance Co. in Houston.

Wang's keynote address, however, did much to allay many users' concerns — at least for now — about the future of Uccel and the software in which the companies have invested. In addition, Wang met with users group presidents prior to the keynote address in an informal session. Most of those in attendance said the session helped clear the air.

"Wang was very straightfor-

ward about his approach regarding Uccel as a viable part of Computer Associates and his plans for listening to the user groups to determine future product direction," said Gary Arnold, production analyst for the Federal Reserve Bank of St. Louis and president of the Seven St. Louis Users Group.

"I'm optimistic, and we as user group leaders should display a positive approach and give Computer Associates the opportunity to make this transition as easily as possible," Arnold said. He added that Wang agreed to meet with Uccel users group presidents again within four to six months "to evaluate the effects of the merger."

Several Tex Us 7 members said they, too, would keep an open mind about the merger for now, adding that time will be the determining factor. "The next 12 to 18 months will show what's really going to happen," Fowlkes said.

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BY JAMES A. MARTIN
CW 1479

NEW ORLEANS — At the annual Uccel Corp. users group meeting here last week, ADC2 of a planned merger, the official said, adding that there appears to be nothing extraordinary about the Computer Associates-Uccel marriage proposal and no foundation for an antitrust case.

Furthermore, some users said the impending Uccel merger with Computer Associates Inc., added to their skepticism and concern regarding ADC2's future with Uccel.

Currently, the safest course of action is to stick with ADC2 as long as possible, the users said.

ADC2 users met with Uccel representatives last week to establish an independent users group and to compare Uccel's UCC7 job scheduler with ADC2, the Cambridge Systems Group, Inc. package acquired by Uccel in late 1986.

Although Uccel has promised to continue supporting ADC2 as

long as there are enough interested users, the effects of the Computer Associates-Uccel merger on ADC2 and other Uccel products is still largely unknown. ADC2, UCC7 and several Computer Associates job scheduler packages were once competitors, but with the merger, Computer Associates will own them all.

Immediate plans are to continue supporting ADC2, perhaps with future enhancements, Uccel officials said. In addition, UCC7 will still be updated.

However, the merged company's "global goal" would be to merge the job scheduling packages over the long run, said Peter J. Barris, vice-president and general manager of Uccel's Systems Software Division.

Barris said that it was too early to elaborate and that the merger was not scheduled to pass shareholder and regulatory approval until later this summer.

An informal poll taken at the ADC2 meeting indicated that no one present had accepted Uccel's

offer to convert from ADC2 to UCC7.

A Uccel spokesman confirmed that the number of ADC2 users who had converted to UCC7 was minimal.

"After I heard the merger about UCC7, I'm surprised at some of the things it can do," said Charles Patterson, a systems analyst with Procter & Gamble Co. in Cincinnati. "But ADC2 does these things more easily."

"We just won't have the same functionality with UCC7 that we have now," Patterson said. "Our company will use ADC2 until UCC7 is in a state in which it would be a benefit to use."

ADC2 users were in an uproar earlier this year when Uccel, after acquiring Cambridge Systems, announced it would discontinue marketing and support for ADC2 in favor of UCC7.

Although Uccel offered to convert ADC2 users at no charge, the company ultimately was forced to rescind its decision to drop support because of the negative response.

Loren, Yocam said, has demonstrated throughout his career that technology can be leveraged to create a competitive edge and can become part of the company's business.

Cigna's Loren joins Apple

CUPERTINO, Calif. — Apple Computer, Inc. last week named Allan Z. Loren, former president of Cigna Systems, vice-president of information systems and technology. He will officially join Apple in September.

Loren, 49, will be responsible for all information systems management at the company. His duties will include working with Apple's sales and marketing staff

and providing counsel to product developers. He will report to Delbert Yocam, executive vice-president and chief operating officer.

Loren held several corporate information management positions during his 16 years at Cigna Systems, the information systems group at Cigna Corp., a Philadelphia-based insurance company.

CORRECTION

The Design/1 module of Arthur Andersen & Co.'s Foundation application development product (CW, June 22) costs \$4,300 per user at a site with 40 users.

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Digital News, December 1, 1986.

CASE tool a data storage bank for developers and analysts

BY CHARLES BABCOCK
(A-1717)

ATLANTA — Knowledgeware, Inc. announced a \$100,000 mainframe computer-aided software engineering tool last week that is said to provide software developers with a central encyclopedia for storing systems analysis data and testing programs.

The tool, called the Information Engineering Workbench/Mainframe Encyclopedia and Knowledge Coordinator, was designed to collect data from Knowledgeware's programmer's workstation, the personal computer-based Information Engineering Workbench/Workstation.

Knowledgeware is believed to be trying to integrate front-end design tools with its Cobol application generator, Gamma, which the company acquired in its merger with Tarkenton Software, Inc. last year.

Fran Tarkenton, chairman of Knowledgeware, said, "Ultimately, the Information Engineering Workbench will generate systems automatically from analysis work done on the front-end PC tools."

The mainframe tool is not scheduled to be available until late fall.

Systems analysts work with the personal computer tool using a mouse and

bit-mapped graphics to diagram systems, with the diagrams and specifications stored in the mainframe encyclopedia. The mainframe product supports IBM's 3278 and 3279 file transfer and emulator boards and Digital Communications Associates, Inc.'s Irma boards for uploading data, said Donald P. Addington, Knowledgeware's vice-president of marketing.

Twelve beta-test sites

The mainframe workbench runs under IBM's MVS with the IBM's Time Sharing Option and ISPF/Program Development Facility. Knowledgeware said the product is in beta testing at 12 sites, including Amih Corp., Babcock & Wilcox, Duke Power Co., and Reader's Digest Association, Inc.

The mainframe tool can invoke standard security measures and offers the extensive processing and storage capacity needed for encyclopedia management in a multiprogrammer project, Addington said.

Whole or partial encyclopedias may be uploaded or downloaded to individual workstations during the development process, the vendor said. The mainframe product reportedly can also consolidate the work of individual programmers on a project.

DEC

CONTINUED FROM PAGE 1

IBM also announced that Systems Network Architecture (SNA) networks can now be reconfigured without taking the whole system down and that a 9370 can announce its presence on the network to a Netview host as soon as a user boots up the system. DEC has had the equivalent of both these capabilities for years, according to Johnson.

But whereas IBM has opened up its network management system to non-IBM communications devices via the Netview/PC interface, third-party networking products can only participate in DEC's network management system if they have been certified as compatible with the Decnet communications system, a DEC spokesman said.

Strategy involves OSI support

DEC's strategy for hooking other vendors' systems into its network management products is to support Open Systems Interconnect (OSI) multivendor network management protocols, said Mitchell D. Perlitch, DEC product marketing manager for networks and communications, during a separate interview with *Computerworld*.

"First, our system will coexist and swap data with the OSI system, then it will migrate to OSI," he explained.

OSI network management standards are not likely to appear for another two years. Perlitch claimed, however, that IBM will have a much harder time interfacing various proprietary networking devices to Netview than DEC will have in interfacing with OSI-compatible systems, "since they will all be using the same OSI protocols."

DEC may not want to open up its current network management system to other vendors, as IBM has with Netview/PC, "because it would mean migrating those systems, as well as DEC's, to OSI," suggested John Carosella, a consultant at Network Strategies, Inc. in Fairfax, Va.

DEC's Johnson said that while DEC perceives no need for integration of voice and data in the local environment, it does see a need in wide-area networks. "Our statement of direction is to use Decnet to manage a worldwide voice/data net-

work," he explained. "IBM's time frame is 18 months hence; ours is less."

Current Decnet products allow terminal-based monitoring of line failures and collection of usage statistics on remote Decnet gateways. Future products will monitor voice and data transmissions on individual lines passing through T1 switches and multiplexers, Johnson indicated.

DEC speakers at the conference were typically disenchanted about major communications and network management announcements in the work. But Katherine Trimm of Protal, Inc., a Tucson, Ariz., consulting company, claimed to have inside information that the company is "accelerating, not slowing down, its internal product development" in those areas and will make major introductions in the next two years.

The products are likely to address security issues and distributed software management, which DEC has "just begun to address" with its Remote System Management (RSM) product, said RSM. RSM allows for centralized backup and software maintenance and downloading to remote workstations.

Product expected in September

DEC is expected to announce at its Decworld show in September a dedicated network management processor incorporating expert system technology, according to John Walsh of New York consulting firm Integrated Strategies Group, Inc.

DEC would not confirm or deny whether it is working on a commercial expert system, but DEC representatives said expert systems are currently being used by field-service representatives.

If market demand dictates, DEC will use OSI as its gateway to IBM's Systems Application Architecture (SAA), Johnson said. However, the real issue is whether DEC will have to recognize SAA as a de facto standard and provide gateways to the protocols as it currently does to SNA, according to Arthur D. Little, Inc. senior consultant Norman Weizer.

SAA, which standardizes how users and applications interface with major IBM systems, "will be a big competitive advantage for IBM because vendors — DEC included — will have to conform, and it shrinks value-added possibilities," Weizer said.

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DEC launches ACT attack

BY ALAN ALPER
COWI/STAFF

NEW YORK — Digital Equipment Corp. last week opened an Application Center for Technology (ACT) here as part of its full-scale assault challenging IBM's dominance of large corporate accounts in the metropolitan area.

DEC's ACTs, launched in August 1986, are aimed at giving customers and prospects a first-hand look at the networked computing solutions DEC can provide. The centers, which house the equipment of a typical corporate information network, give DEC the opportunity to showcase its unified architectural approach to computing and interconnection with IBM systems, noted Manny Barreto, New York ACT manager.

DEC said it expects to have 17 such centers in operation worldwide within the next two months, each focusing on vertical markets reflecting the types of businesses prominent in a specific locale.

Targets Fortune 500 data centers. The New York ACT is located in midtown Manhattan — within blocks of IBM's corporate headquarters — and targets the financial services marketplace and corporate data centers of Fortune 500 companies. The center is composed of private demonstration areas running typical office computing, banking and brokerage applications.

Prospects and customers visiting the ACT will get a first-hand look at retail banking systems, Ethernet local-area networks, artificial intelligence products and trader workstations. The New York ACT is staffed with eight consultants with expertise in areas such as retail and commercial banking, brokerage and MIS.

The center also has a development staff to provide customers with more effective and customized computing solutions. Barreto said, "Each company in the financial market, in particular, is looking for a competitive edge," he noted. "The center will provide the required tools customers need to distinguish themselves from others in the marketplace."

Claude Thomas, director of DEC's financial industry marketing group, said the New York ACT will help the firm broaden its presence in the financial services marketplace. He declined to provide specific figures but said DEC's revenue growth in the financial services business is "an order of magnitude" greater than its quarterly growth rate, which has recently averaged about 25%.

DEC's 4-month-old 8974, a cluster of VAX 8700s that provides the processing power of an IBM 3090 mainframe, should help the firm increase its penetration of the financial services marketplace, Thomas said.

As further evidence of its increased presence in the financial services marketplace, DEC disclosed last week that it has signed a \$30 million agreement with Edward D. Jones & Co., a St. Louis brokerage firm, to supply equipment for its branch automation system. DEC beat out IBM for the contract, according to Richard Maine, general partner of data processing at the firm.

Hercules offers graphics option for PS/2s

BY DAVID BRIGHT
COWI/STAFF

BERKELEY, Calif. — Graphics maven Hercules Computer Technology, Inc. is expected to announce this week an add-in card for the IBM Personal System/2 that provides an alternative to the IBM Video Graphics Array (VGA) that is built into the PS/2.

Called the Hercules PS/2 Card, the board is said to add Hercules 720-by-348-pixel resolution and the company's Ramfont mode for speeding up character-oriented programs.

According to Hercules, the board op-

erates without interfering with the VGA.

Since the board is compatible with the company's monochrome Graphics Card Plus and the Hercules Incisor Card for the IBM Personal Computer family, users of the earlier systems can be assured of graphics compatibility with the PS/2, according to Hercules.

Improved spreadsheet display

The board fits into the PS/2 Models 50, 60 and 80. The Model 30 accepts Hercules cards built for the IBM PC family.

"Spreadsheets and word processors will display and function better when a PS/2 is enhanced by this new Hercules PS/2

graphics card," asserts Bruce Cummings, who is executive vice-president of Hercules.

The board also supports the original Hercules Graphics Card. That card introduced in 1982 quickly became a standard after Lotus Development Corp. added support for the board in its Lotus 1-2-3 spreadsheet.

Many companies have since provided boards that emulate IBM's Enhanced Graphics Adapter standard, but Hercules has not.

Shipments of the new board are scheduled to begin in the fall. The company has not set a price yet.



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Toshiba import ban considered

Senate discusses plan after firm sells high-tech naval gear to USSR

BY MITCH BETTS
SAN FRANCISCO

WASHINGTON, D.C. — Reports that a unit of Japan's Toshiba Corp. was involved in illegal sales of high-tech naval equipment to the Soviet Union have triggered proposals from angry U.S. legislators to ban all Toshiba imports, including Toshiba America, Inc.'s popular line of laptop computers.

"If that ban takes place, we cannot do any business in America," said Nobuo Iizuka, chairman and chief executive officer of Toshiba America. He said the proposals would ban imports of finished products and component parts.

Meanwhile, Toshiba America's bid for a huge U.S. Depart-

ment of Defense contract for laptops has been jeopardized by the military's outrage over the actions of Toshiba Machine Co., a Toshiba affiliate in Japan that supplied the Soviet Union with advanced submarine propeller technology.

'Put on hold'

Pentagon spokesman Glenn Flood said the laptop procurement, in which Toshiba was a leading contender, "has been put on hold, on the back burner for awhile, until this whole thing is all worked out."

Toshiba America's Information Systems Division, based in Irvine, Calif., offers a variety of portable computers compatible with IBM Personal Computers, including the fast-selling T3100

laptop. Of the 400,000 laptops sold in the U.S. this year, 80,000 have been T3100s, according to Raymond Falls, analyst at Data-Pro Research Corp. in Delran, N.J.

U.S. Sens. Jake Garn (R-Utah) and John Heinz (R-Pa.) are drafting an amendment to the pending Senate trade bill that would ban imports for two years from Toshiba or any other firm guilty of export control violations. The senators want "an amendment that would take specific retribution against companies like Toshiba that endanger the security of our country and that of our allies," said Laurie Snow, spokeswoman for Garn.

Likewise, Rep. Duncan Hunter (R-Calif.) has introduced a bill that would ban all imports from

Toshiba and Kongsberg Vapenfabrik, a Norwegian firm involved in the equipment sales to the Soviet Union and would forbid the DOD to enter into contracts with either company.

'Biggest problem'

The new problems for Toshiba come on top of recent U.S. trade sanctions that hit Toshiba's 16-bit laptops with punitive 100% tariffs (CW, April 27).

Iizuka said the legislative proposals to ban Toshiba imports are "by far the biggest problem" the company faces. "As compared to that situation, nothing else seems to matter," he added.

In a strong display of congressional sentiment, the U.S. House of Representatives recently adopted an amendment offered by Hunter that requires the U.S. Secretary of State to "enter into discussions with Japan and Norway regarding compensation for damage to the U.S. national se-

curity" resulting from industrial espionage. The amendment passed by a vote of 415 to 1.

"Delivering this classified technology to the Soviet Union may cost the American taxpayer more than \$30 billion in order to regain our previous level of security," Hunter said.

He added that U.S. intelligence officials discovered that Toshiba and Kongsberg provided the Soviet Union with computer-controlled milling equipment used to make propeller blades that are 20 times quieter than before, making undetected detection far more difficult.

The equipment sale has been widely characterized as one of the most damaging breaches of Western export controls on military technology since World War II. Government officials in Japan and Norway are reportedly taking steps to strengthen their export controls and punish the violators in order to end off congressional sanctions.

TI unweavers Explorer AI workstations, software

BY STANLEY GIBSON
SAN FRANCISCO

AUSTIN, Texas — In the first commercial use of its LISP microprocessor, Texas Instruments, Inc. announced last week a new Explorer artificial intelligence workstation.

"It is the world's most powerful AI workstation," claimed Bill Martin, president of TI's Data Systems Group, which is based here. He said the new system provides more than five times the performance of the previous Explorer system.

The workstation comes in

two models, the Explorer II and the Explorer II LX. The LX model contains both the LISP chip and a Motorola, Inc. 68020-based processor running TI's version of AT&T's Unix System V as a single system. The LX allows users to incorporate AI capabilities into many Unix applications on the market, the vendor said.

TI also announced Release 3.0 software, which it claimed offers higher performance, better development tools and support for IBM's System Network Architecture, Digital Equipment Corp.'s Decnet, Transmission

Control Protocol/Internet Protocol and Network File System.

Included with all Explorer systems, Release 3.0 is an environment for developing knowledge-based systems for manufacturing operations, scheduling, equipment repair and financial planning.

Upgrade possible

The Explorer II is now in production and is scheduled to be delivered to customers in July, Martin said. Explorer II systems start at \$49,900 to \$99,900, with quantity discounts available to end users and value-added resellers. Current Explorer users may upgrade to the new system by swapping a board at a cost of \$25,000. Memory configurations for Explorer II start at 8M bytes and can be upgraded to 128M bytes.

Prices were lowered on current Explorer systems from 5% to 15%. An entry-level Explorer configuration with 4M bytes of memory and a 140M-byte Winchester disk is now priced at \$29,900.

TI said the Explorer LISP microprocessor puts 60% of the original two-board Explorer processor on a single custom-made chip. With more than 553,000 transistors on a 1-sq-cm area, it supports an Explorer-compatible supersets of Common LISP.

Industry analyst Harvey Newquist of DM Data, Inc. in Scottsdale, Ariz., praised the new machine but questioned the size of its potential market. "Everyone who wanted one [an Explorer] already has one," he said.

Large corporate accounts do not want a LISP machine, Newquist said. Instead, they are favoring workstations for AI tasks because they are cheaper and

can be used for AI as well as other applications, he explained.

Newquist said the upgrade offering is reasonably priced but that the installed base of Explorer systems is only some 500 to 700 machines and fewer than half of these are likely to be upgraded.

Separately, TI introduced new releases of its Personal Consultant expert system develop-

ment tools, intended for IBM Personal Computer and PC AT-compatible microcomputers and Explorer workstations.

Personal Consultant Plus Release 3.0, priced at \$2,950, offers support of the Personal Consultant Images and Personal Consultant In-line add-on packages, external language interfaces to C and Turbo Pascal. Personal Consultant Easy Release 2.0, intended for beginners, is priced at \$495.

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Amdahl lowers 3090-class ante

BY JEFFREY BEELER
C/STAFF

SUNNYVALE, Calif. — Amdahl Corp. last week lowered the entry point for its IBM Sierra-class mainframe line with the introduction of a uniprocessor that reportedly provides about 25% better price/performance than IBM's 3090 Model 180E.

Rated at 17.2 million to 18.5 million instructions per second (MIPS), the 5890-180E is a degraded version of Amdahl's previous entry-level uniprocessor — the 5890-190E, which executes 22 to 23 MIPS, according to a company spokesman.

Although both machines compete directly with the 3090 Model 180E, they do so through contrasting means, according to Annex Research, Inc. President Bob Djurdjevic.

The old one-two

While the smaller of the Amdahl systems is roughly comparable in throughput to its IBM counterpart but costs \$400,000 less, the larger outperforms the 3090 Model 180E by more than 20% but is priced about the same.

MCI linked to Wang

BY PATRICIA KEEFE
C/STAFF

WASHINGTON, D.C. — MCI Communications Corp. announced last week software linking users of Wang Laboratories, Inc.'s Wang Office to MCI's worldwide public electronic mail service.

MCI Mail Link for Wang Office reportedly allows Wang Office users to access MCI Mail delivery options, including worldwide hard-copy delivery and international telex delivery to more than 1.6 million telex machines. The two systems appear to the user as a single integrated mail system through which information is exchanged and accessed.

Wang users can now send messages to any MCI Mail subscriber, to users of other electronic messaging systems registered with MCI Mail or to any address worldwide.

MCI Mail for Wang Office operates on Wang's family of VS superminicomputers and was designed to be installed by the customer. The software was developed and is supported by Information Management Consultants, Inc. in Alexandria, Va., a Wang-approved software vendor. It is being sold by MCI; pricing starts at \$1,700.

The announcement of the 5890-180E marks the third time Amdahl has positioned a pair of processors — one stressing an edge in price and the other an advantage in computing power — against a lone 3090 equivalent. Amdahl first used the practice

against IBM's 3090 Model 200E, which is bracketed on the price side by the 5890-200E and on the performance side by the 5890-300E. The second application of two-in-one coverage involved IBM's 3090 Model 400E, which the plug-compatible main-

frame vendor countered with both its 5890-400E and 5890-600E, Djurdjevic said. "Now with the 180E and 190E, Amdahl is extending the same kind of strategy to the low end of its product line," he added.

In contrast to most of the 5890 family, the 180E is targeted at the division-level offices of major corporations rather than their corporate computing sites.

The entry-level uniprocessor is also intended to serve as the central host in "smaller customer environments that will probably need a growth path over time," the Amdahl spokesman said.

In a minimum configuration of 16 channels and 32M bytes of internal storage, the machine costs \$2,225,000. First customer shipments of the 5890-180E are set to begin in September.



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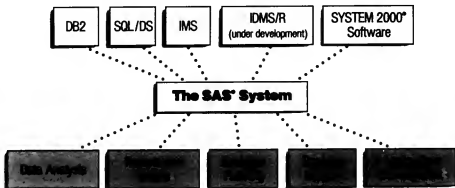
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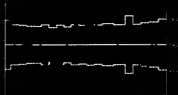
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Driver first to expand PS/2 memory

Borland claims EMS-compatible unit adds up to 2M bytes of memory per board

BY ED SANNELL
LA 03/27

SCOTT'S VALLEY, Calif. — Borland International, Inc. last week announced it is licensing a driver compatible with the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) that provides the first expanded memory capability for IBM's Personal System/2 Models 50 and 60.

Using the EMS Driver software developers and OEMs can access the EMS

on IBM's 286 Memory Expansion Option, which is a memory board that adds up to 2M bytes of memory per board on PS/2 systems.

The driver takes advantage of the unpublished bank switching abilities of the 286 Memory Expansion Option, which delivers high-speed memory management, according to a company spokesman.

The EMS Driver, when used in combination with the memory board, reportedly increases page-mapping speeds by up

to 150 times above those obtained by EMS simulators.

Borland claimed its driver supports EMS features unavailable with EMS simulators.

Also known as . . .

These include aliasing, which allows multiple memory addresses to be mapped to the same physical address.

Popular applications that require aliasing in order to use EMS include Lotus Development Corp.'s Hal and Javelin Soft-

ware Corp.'s Javelin.

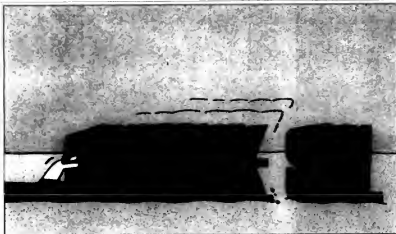
"This is a boon to corporate America. Most companies have large spreadsheet and data base applications, and they can't afford to wait for long-term alternatives," said Spencer Leyton, Borland's vice-president of business development.

Claimed faster

Leyton said the driver's implementation is "many times faster" and more efficient than using protected mode.

Borland said it will include the EMS Driver with such products as its desktop manager, Sidekick Plus, its analytical data base, Reflex, and its EMS toolbox.

The product includes an EMS random-access memory disk, printer spooler and quick-setup program, a spokesman said.



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Orion widens links to IBM

Tool offers SNA support, eliminates redundancy

BY PATRICIA KEEFE
LA 03/27

BERKELEY, Calif. — The Orion Group last week enhanced its IBM connectivity by announcing software that supports terminal-to-host communications over networks based on IBM's Systems Network Architecture (SNA).

The Orion SNA0123 Facility provides the synchronous data link control (SDLC), physical unit (PU) and session-level facilities needed to emulate SNA logical Units 0-3, or dumb devices, while sharing communications ports with IBM's peer-to-peer LU6.2 facility.

The SNA0123 Facility is unique in that it eliminates redundancy, both in coding and in physical connections, by supporting terminal-to-host and peer-to-peer connectivity over the same physical link, said Orion spokeswoman Hilary Glenn.

This is accomplished by having SNA0123 and Orion's SNA62 Peer Communications Facility coexist in the same processor sharing the same lower level SNA layers — the SDLC and PU components. This is said to allow users to conduct LU0, LU1, LU2, LU3 and LU6.2 sessions simultaneously over a single link.

SNA support in demand

The SNA0123 Facility was developed in consultation with The Netherlands-based Philips International B.V. in response to customer demand. "It turns out that despite all the hoopla about LU6.2, most of Orion's customers still need support for terminal-to-host facilities in SNA," Glenn said. Most of these installers are a mixture of dumb and intelligent devices, and vendors selling into these sites have to cover all their bases, she said.

Orion said SNA0123 provides communications support for the IBM 3270 and 3770 families of terminals and processors, as well as the 4700 and 3650 systems used in financial applications. It is written in C language for portability to a variety of processors and operating systems.

Orion said SNA0123 will be available in September as an enhancement to the SNA62 Peer Communications Facility. Pricing depends on volume purchased.

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EDITORIAL

Resigning to fate

To homeowners everywhere, there are certain maintenance obligations that, because of their inevitability, great expense and lack of return on the investment, are particularly contemptible.

Such obligations include putting in a new driveway because the old one's cracked and sprouting weeds or paying a tree surgeon to clean up a winter's kill of mature trees.

It is with this same sense of contempt — and resignation — that MIS professionals view software maintenance. To them, it is the third ugly, snarling head of fate, along with death and taxes.

This week's Executive Report, beginning on page 51, takes a hard look at the maintenance blues through the eyes of three MIS professionals. Their maintenance stories — nightmares, in some cases — are nonetheless laced with hope that the vendor community is responding to the spaghetti-code dilemma with increasingly functional products.

To get an idea of just how bad the problem is, consider that in many, if not most, shops, half or more of the development cycle outlays are voraciously consumed by maintenance expenditures. And, as Tony Scott of Indiana Bell says in the report, the millions of dollars spent on maintenance does little or nothing to increase the direct benefit to the business. That is sort of like putting in a driveway, which everyone expects a house to have in the first place.

And if you think MIS management looks scornfully on the maintenance curse, save some pity for the rank-and-file programmers who have to do the grunt work in salvaging structure from spaghetti.

The programming process is a cerebral, creative process, which is what drives bright people to enter the programming profession in the first place. But after sitting day after day trying to eliminate a plethora of GOTOs from a 200,000-line payroll application, programmers will fade as fast as interest in the job.

For all these reasons, it is becoming increasingly attractive for shops to farm out the maintenance chore to outside contractors. But attractiveness does not necessarily translate into cost-effectiveness in this case, because no one knows the code like the programmers who work with it every day.

Thus, the most important piece of advice in the report is to first undertake the arduous task of determining just what code needs to be restructured. One way to accomplish this is to review past maintenance projects to see whether the costs were justified or whether further costly modifications were needed. The latter is a case for junking the code entirely and starting fresh.

Also, take a hard look at the tools available to restructure your Cobol, but don't look through rose-colored glasses. While the professionals in the report generally praise the products, they stress that the tools are really first-generation products.



LETTERS TO THE EDITOR

Don't be misled

Henry Eric Firdman's article, "How not to build an expert system shell" (CW, Feb. 16), summarized sound advice for companies new to expert systems. However, readers may be misled by his advice in the following two respects:

First, the cost of developing an expert system need not be as high as Firdman suggested. For example, he cited a figure of \$21 million for Schlumberger Ltd.'s Dipmeter Advisor system. I expect that this figure has been taken from an estimate of the cost of Schlumberger's entire investment in artificial intelligence research and development that was published in 1984. The Dipmeter Advisor effort accounted for less than one-tenth of that number, including engineering costs associated with transferring it to field use.

Second, Firdman cited an observation of mine about how the Dipmeter Advisor and other early expert systems actually developed as a prescription for how expert systems should be developed. In a 1984 *AI Magazine* article, I called it an oscillating focus of attention. The observation is that during development, one may see periods when the domain knowledge of an expert system must be improved and extended, interleaved with periods when the underlying tools (or shell) must be improved and extended.

There is no doubt, as Firdman noted, that commercially supported tools ought to be investigated first. When an existing tool matches the problem to be solved, substantial start-up and maintenance costs can be avoided. However, new problem areas may require new techniques. In

addition, powerful tools simplify development of more ambitious systems. This has been borne out at Schlumberger. The tools developed during the Dipmeter Advisor project have been used in several additional systems — each developed at a fraction of the cost of the Dipmeter Advisor.

Readers should not conclude from Firdman's article that early exploratory efforts undertaken by a company are necessarily wasteful. On the contrary, experiments like the one undertaken by Schlumberger have resulted in a better understanding of expert systems, how to develop them and how to match exist-

ing tools to the task at hand. The expert systems community progresses via oscillation between development of new tools and their application.

Read G. Smith
Program Manager,
Knowledge-Based
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Schlumberger Ltd.
Palo Alto, Calif.

Truly distributed

We at Oracle Corp. were interested and amused by Shaku Atre's column about distributed data base management systems (CW, May 18). In the column, Atre reported that none of today's vendors provides a "truly distributed DBMS." She then defined what, in her opinion, a distributed DBMS should be.

Interestingly, Atre's column followed by a few weeks an article reporting the Gartner Group, Inc.'s similar findings about the distributed DBMS landscape and similar ideas of what a distributed DBMS ought to be.

It seems, in fact, that one of the features in most industry magazines and newspapers this year is an article by or about a pundit who dangle points out that none of the software vendors has a truly distributed DBMS. In each case, a set of highly desirable features is posed as being the definitive set required for any product that purports to be distributed.

This is akin to my defining a car as a vehicle that will go faster than the speed of sound, will not operate when an innocent person is behind the wheel and will withstand a 50 mph crash with no damage to the vehicle or occupants. Having defined this eminently desirable vehicle, I can

Continued on page 22

This week in history

June 27, 1977
Salaries for DP personnel are at an all-time high, according to a survey by Robert Half Personnel Agencies, Inc. In a large installation, a beginning programmer earns a yearly salary of \$12,000 to \$14,500, an operator can command from \$10,000 to \$14,000 and a DP administrator can expect \$20,000 to \$25,000 a year.

June 28, 1982
The FBI arrests five employees of Hitachi Ltd. and Mitsubishi Electric Corp. for allegedly conspiring to transport proprietary IBM computing technology from the U.S. to Japan. The men reportedly paid \$650,000 for IBM systems secrets they believed were stolen.

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When knowledge truly is power

To bring computing power to the people, tell them they already have it

JOHN BARNES

The advertising community has created new hype to further confuse end users. "If you're into power, NEC has an announcement that should really get your adrenaline racing. We've just enhanced the hottest AT-class PCs on the market — our Advanced Personal Computer IV — and expanded it into three powerful systems: Powermate 1, Powermate 2 and Businessmate. So no matter what your needs, you can have the power to run faster. The power to dig deeper. The power to really take it to the limit — even when you're not sure what the limit is."

Power, Apple Computer, Inc. says its ad is "restricted for viewing by businesses with astronomical power demands only... the power of today's \$30,000 workstation. At a fraction of the cost... room for up to six expansion cards, so you can add new power whenever it's needed... This power is made possible by one of the most advanced processors ever to grace a motherboard."

Power can be bought by the professionals, too. Personal computers have power. Languages have it, and so do workstations, networks and printers. You can get it by clustering, by adding cards or more advanced technology, by expanding memory, by "cutting cycles per memory write," by giving... more programmers access to an advanced program development environment."

Power sure sounds good. And everyone knows what it is. When there's a power shortage, the lights dim and motors run slow. Cars with more power pass slower cars on the road. People with more power can tell people with less power what to do.

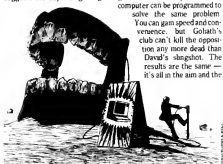
The message is clear: Just buy some. You'll be glad you did. Later, you'll find out all the things you can do with it.

Then you discover that EMC Corp. measures power in memory-write speed. NEC Corp. in kilobytes. Computer Corporation of America in generations and Apple in dollars, apparently. In fact, when you look closely, you find that "power" is variously used in mean flexibility, speed, random-access memory (RAM), performance, capability, compatibility, some sort of general undefined goodness or any combination of the above. "Power" is whatever the product being

sold has a lot of.

I found these examples in just a few hours of leafing through various business and computer magazines. The word "power" is used to sell hardware and software almost as often as it is to sell cars, which really can claim the attribute. Power means whatever the seller wants it to. So for you as buyer, it means nothing at all. It's a pure buzzword.

But power tells a lot about what people think they're buying. Power connotes the ability to control, to enforce one's will, to overwhelm by sheer brute force, to outrun anything or anyone else in the environment. It suggests the buyer is getting a



competitive weapon — which is a half-truth at best.

People with a computer can do some things better than people without one. Power, with all its connotations of physical force, suggests you will be using your computer to bash in the opposition's skull.

Not bigger, better

Effective use of computers is not just doing more things better. It's doing them better. Working smarter, not harder, in the old phrase, by taking the stooge work out of dealing with information, leaving more time and more completely processed information with which to plan, prioritize and act. It isn't what you do with, but what you do.

A few years ago, political cartoonist Tom Darcy depicted a bewildered general saying, "It's my job to count the casualties after every battle years ago I could count on my fingers. Then I had to switch to a pad, then to a notebook, then to a tabulating machine. Next week we're getting computers. I don't see how the Viet Cong can withstand this kind of technological offense."

The promise of power gives the buyer the idea that there is a shortcut: to success; that if we concentrate on the tool, the task will take care of itself. The idea is

pleasant to believe, so it will probably sell a lot of machinery and software. But it's wrong.

Suppose my computer possesses one-tenth the RAM, half the speed and twice the years since the introduction of my competitor's machine, and I program in Basic, and he programs in Ada. If I'm using a sound set of algorithms to optimize product mix and plan a marketing campaign, and he's just using standard procedures to do payroll, inventory and accounts receivable, I'll wipe him off the map every time.

Alan Turing proved it before the first computer was even built: If one computer can be programmed to solve a problem, any computer can be programmed to solve the same problem. You can gain speed and convenience, but Goliath's club can't kill the opposition any more dead than David's slingshot. The results are the same — it's all in the aim and the

skill of use.

In short, computerizing what you've always done may save you time and labor, but contrary to the illusions fostered by the word, "power," automation by itself won't increase your market share, won't make your department more important and won't defeat the competition.

At best, it will free resources that can be better used elsewhere. As for where they can be better used, that again is a problem for intelligent analysis, not for mere crunching.

When the ad agencies push "computing power," they promise something that doesn't exist and wouldn't help much if it did. And when, thousands or millions of dollars later, the promised miracle of power fails to arrive, they leave you holding the unpleasant bag. The advertisers sell the emperor his new clothes and leave you with the job of telling him what he bought, what it's made of and what it makes him look like.

The next time an end user wants power, show him that what's needed is something else entirely. There is really no such thing as computing "power," no matter how much you pay for it. There is such a thing as intelligence, and you've probably got that already, in house.

Changing the rules of the PC market

AMY WOHL



The game exhibit floor at Comdex/Spring '87 during the first week of June was

livestock of two things. IBM gets to set the rules for personal computer standards at least one more time, even if it no longer owns the lion's share of this market.

IBM does not get to choose who else plays in this market or what role those competitors choose.

Evidence of IBM's primary role in setting PC standards was spread all over Comdex. Competitive PC vendors were quick to stack up signs announcing PS/2-compatible products (or their hopes of products, anyway) and directions on how to use them.

Even Compaq Computer Corp. confessed that a PS/2-compatible machine may be required by its customers. Why else would it build one? And what better proof that IBM and not the mythical Intel Corp. standard still rules?

Every clone maker believes, in the absence of evidence to the contrary, that building PS/2 clones will be possible, although necessarily more difficult than heretofore believed.

IBM believes it will be possible to offer significant levels of additional function through silicon integration. It also plans to make significant annual enhancements and product-line changes every two years — making it, at the very least, difficult (and, IBM hopes, impossible) for competitors to keep up. Customers who want to take advantage of the full IBM PC offerings will need, or so IBM claims, to buy from IBM.

Customer reaction

I have delivered more than a dozen speeches since the IBM PS/2 announcement on April 2. I am also currently surveying customer reaction to the new IBM product. The tallied results are not yet in, but shows of hands at a number of conferences (and early readings of the survey test leaves) suggest that customer enthusiasm for the PS/2 announcement is only a little different than IBM thinks, at least for now.

Here are my results so far:

• Yes, many customers do plan to move to the PS/2 product line eventually.

• Only few — some of them very large IBM accounts that may think of the PS/2 as more of a very intelligent terminal than a PC — have decided to make a move soon. Most customers are adopting a wait-and-see attitude.

Particularly, they are waiting to see if the OS/2 operating system is really delivered on time and how much new software this new operating system can entice from the third-party developers.

(A cautionary note for IBM and Microsoft Corp. critics: An IBM analyst recently confessed to me that IBM, too, worries about Microsoft's difficulty in accurately predicting when new or enhanced software will actually be ready. So IBM has gone the normal IBM route, the insider continued, and put a great deal of buffer time into the announced schedule. IBM is reasonably confident of meeting or beating the schedule and expects the number of beta-test versions of OS/2 already in third-party software developers' hands, as well as to the amount of IBM project man-

THE customer is always right, particularly if he decides he wants to buy something.

agement and control being provided.)

• A small number of customers have decided that PS/2 isn't (or can't be) for them. This group seems to include some customers who don't want to do business with IBM and a larger number who feel their past practices or organizational policies (such as the government low-cost bid policies) will keep them out of the PS/2 camp. A few customers say their investment in the PC technology is too deep to contemplate a change to a noncompatible technology anytime soon.

I suspect that if the PS/2 clone market fails to develop, which is unlikely, and if particularly attractive applications software comes to the PS/2 market, IBM might change its mind. After all the customer is always right, particularly if he decides he wants to buy something.

In any case, the most pressing question for nearly every computer professional and end user I've met this spring is what to do and when to do it. I can see our recommendations — and the

Continued on page 22

Changing

CONTINUED FROM PAGE 21

actions of computer customers — starting to fall into predictable industry patterns.

• If you mainly or entirely buy PCs from IBM or with IBM labels, your decision is made. IBM has changed the product they are offering, and you will be changing, or have already changed, what you will buy.

Be certain that you are buying adequate power for your current and near-future needs and applications, but remember that IBM will constantly be offering better stuff, as will other manufacturers, and there is no need to rush to move contented users to higher level platforms for

the sake of compatibility.

• If IBM PCs and compatibles are, to your thinking, mainly very-capable, occasionally stand-alone terminals on larger systems, you may in time want to consider moving to the new IBM standard, because it is in this interconnection mode that the integration of the IBM-provided products may be substantially higher than what can be achieved in the clone and compatible market.

• If you are happily using IBM compatibles and clones and don't really need to run current software faster right now, don't do anything differently. But expect — and demand — lower prices for the current generation of hardware.

You can either bank your savings or use them to buy additional computers or

provide additional services, such as support. You will probably have just shed most of your hardware cost in the older technology by the time an application that requires you change your hardware buying decision (such as the Lotus Development Corp. 1-2-3 version of PS/2 software) hits the market. I estimate that this product will come out in late 1988 or '89. Keep your eyes wide open — I think it is more likely to be image- or pattern-recognition-oriented, rather than a numerical application like spreadsheets. Each generation of hardware evokes its own optimal software.

• If you use Apple Computer, Inc. Macintoshes, you will be too busy trying out new image-oriented software to spend much time worrying about this issue at all.

Distributed

CONTINUED FROM PAGE 21

proceed to declare that no company makes a "true" car today. Then, I can wrap up by making rather smug statements about the ethics of General Motors Corp. and others for implying that those things they make are cars.

I think that this approach, like that being taken by the DBMS pundits, is self-evidently fallacious and sensationalist. Note that this letter is not occasioned by the frequently excellent ideas of these individuals concerning what the products ought to do. Rather, it is the tone of innuendo used, with the implicit offer to save the reader from those nefarious software vendors.

Oracle and most other software vendors providing distributed products have been clear and explicit about the capabilities of our current and planned offerings. Most of the excellent suggestions about distributed DBMS advanced by Atre and others are either planned or under consideration for future releases. I have yet to meet a customer or prospect who is operating under the various delusions that Atre seems to believe the vendor community is creating.

Fessly, Atre noted that she mailed questionnaires to 10 software vendors and received not one reply — and this from an industry so aggressive in pushing its products. I would suggest that Atre consider the possibility that the mailbox at Atre International Consultants, Inc. is more in need of investigative reporting than is the distributed DBMS industry. Good grief.

Kenneth L. Cohen
Oracle Corp.

Rude awakening

Referring to "Searching for happiness in MIS" (CW, June 1), if the attitudes of some of the MIS professionals described are typical of the majority, then corporate MIS is due for the same rude awakening that American manufacturing has been undergoing for the past five years.

As a consulting firm, my company has to compete for our clients by assuring them that our firm is enthusiastic about providing them with the highest quality system for the lowest cost. We cannot do this if the client perceives our staff as "typical workers" who do not like their jobs and just put in eight hours.

We would not knowingly have someone, regardless of the person's technical skills, whose attitude is that, "By its very definition, a job is something that you have to do, not something that you want to do." Nor do we have any use for those whose attitude is, "Let's face it, MIS is not the most exciting profession in the world... As far as I'm concerned, all that matters is money."

As the trend toward end-user, departmental and distributed computing continues, MIS professionals will have to move out into the business areas of the company. If MIS departments cannot develop an environment of innovation and personnel growth to provide enthusiastic, motivated professionals to system end users, they may find themselves competing against outside consultants who can.

Mark Crosby
Systems Analyst
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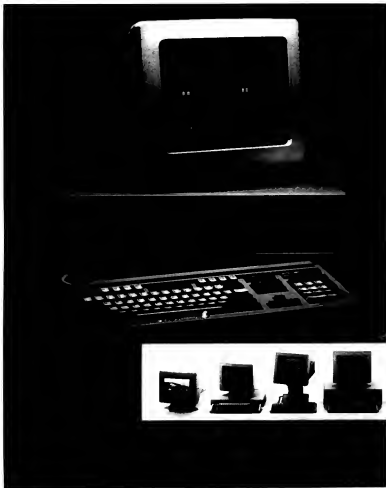
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SOFT TALK



Charles Babcock

Pro-user or antitrade?

A charge of bundling was brought against IBM again six weeks ago; this time it appears to be a difficult charge to sustain. But like the canary in a coal mine, Chief Technology Officer Martin A. Goetz of Applied Data Research, Inc. (ADR) has sent the rest of the software industry an early warning that it would be wise to heed.

Goetz, in case you've forgotten, was the originator of the bundling charge against IBM in the 1960s, when IBM sold computers with an operating system and other software already in place. Goetz charged that IBM was excluding third-party suppliers by saddling customers with its software when they made a hardware purchase.

In 1968, the Department of Justice initiated antitrust proceedings, and in 1969 ADR sued IBM for monopolizing the software marketplace. IBM settled with ADR for \$2 million and announced soon afterward that it was unbundling software from its hardware. Thus, one of the major reasons for the ex-

Continued on page 28

Manufacturing system rewritten

Martin Marietta package goes on-line, works in DEC environments

BY ROSEMARY HAMILTON
CHICAGO

PHILADELPHIA — Martin Marietta Data Systems introduced last week a new version of its manufacturing software that is the result of a substantial rewrite that began three years ago.

"We're no longer chained to our links to the past," said Dan Canzano, director and general

manager of the vendor's manufacturing systems division.

Release 3.1 of MAS-Manufacturing has been converted to an on-line system, whereas earlier versions were batch oriented. It now runs on Digital Equipment Corp. hardware, expanding the number of hardware platforms the system runs on to three, the vendor said. Current releases run on IBM 370 systems hardware as well as the full

line of Hewlett-Packard Co. systems.

The new release also includes optional integration of the MAS financial application modules with manufacturing modules and Help facilities to make it more user-oriented, Canzano said.

MAS-Manufacturing will be offered with hardware or as software only. Customers can purchase individual modules, the

Continued on page 26

Focus led in three directions

BY CHARLES BABCOCK
NEW YORK

PALM DESERT, Calif. — Information Builders, Inc.'s Focus is known as an easy-to-use fourth-generation language and data base management system.

But Kent Walton, a systems analyst in the information center at Northwest Natural Gas Co. in Portland, Ore., said he finds application development with the package "convoluted and hard to understand."

Walton was among several users who voiced concerns about Focus at a recent meeting of the Focus Users for Enhancements (FUSE) group here.

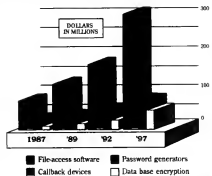
Sharda Kardare, a consultant with the Edison, N.J., facility of Cornell Computer Corp., said she is frustrated that the concatenation sign in PC Focus is different from the one in mainframe Focus and the fact that it has to be translated manually when files are transferred between a personal computer and

Continued on page 28

Data View

Ten-year forecast for
software-oriented security

Password generators, file-access restriction software, callback devices that delay a host session startup until they check the terminal making the request and data encryption are predicted to make up a security market of \$500 million by 1997.



INFORMATION PROVIDED BY INTERNATIONAL RESEARCH DEVELOPMENT INC., NEW YORK

Exec terminal goes graphic

BY CHARLES BABCOCK
NEW YORK

ANN ARBOR, Mich. — Comshare, Inc. has decided that graphics make a better user interface than natural language or voice-activated interfaces and is offering a graphics-based system as part of a personal computer-based executive workstation.

Commander Executive is a package that provides color screens and menus for executive prompting by either a touch-screen monitor or mouse.

Requests for more detail may be invoked by selecting any number, title, graphic component or phrase in a report, chart or document displayed by the system, according to Craig Barrow, vice president of marketing for Comshare.

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Inside

- Online/Database revamps TAB, Page 26.
- Publisher dishes out revenue awards to million-dollar products, Page 28.
- VM Software updates VMbatch, Page 32.

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TAB revamp narrows PC-mainframe gorge

BY ALAN ALPER
LOS ANGELES

PEARL RIVER, N.Y. — Online/Database Software, Inc. said last week it had modified The Application Builder (TAB) the company's personal computer development environment for the Cullinet Software Inc. IDMS/R data base management system, to overcome major discrepancies between PC and mainframe environments.

Online/Database introduced TAB to build mainframe applications on a microcomputer that work with Cullinet's DBMS Release 2.0 of TAB is said to offer

increased data dictionary functionality, improved dialog generation and multiter capabilities.

In addition, the release is said to allow users to window through the system for entity types.

Features value clauses

Moreover, TAB Release 2.0 features multiple value clauses that can be modified as required by the application, according to the company.

This facility is found on about 95% of the mainframe data bases currently in use, according to Gal Wildman, Online/Database's vice-president of operations.

"Prior to 2.0, users had to make modifications themselves," Wildman said. "Now, they won't need to make modifications between the mainframe and TAB."

Embedded in Release 2.0 is an extension to Microsoft Corp.'s MS-DOS that overcomes the 640K-byte memory-address restriction of the protected mode of Intel Corp. 80286 and 80386 microprocessors.

Users said the constraint tended to bog down TAB's performance when generating dialog (C/W, March 9). The MS-DOS extension facilitates the swapping of data in and out of the address space, Wildman said.

The release also reportedly provides security profiling to ensure that users have access to only those TAB functions and dictionary entities that are needed for application development, according to the company.

Additional functions coming

Online/Database has not yet equipped TAB with facilities such as Pageable Maps, for reaching maps without scrolling, and Logical Record Facility, for systems-defined sets that are part of IDMS/R.

"Pageable Maps will be available in Release 2.2, which will come out in late summer. Logical Record Facility will be out in the third quarter," Wildman said.

"Those are the last two facilities required to enable TAB to have everything that is on the mainframe."

Release 2.0 is available at no charge to TAB users as part of the product's maintenance fee. Online/Database said.

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SOFTWARE

Manufacturing

CONTINUED FROM PAGE 25

vendor said, but a full set of modules, including the financial applications, starts at \$150,000.

Software for HP and DEC hardware carries the same license charge, ranging from \$150,000 to \$190,000.

The IBM version ranges in price from \$340,000 to \$474,000.

The software has gone out to initial customers and will be generally available at the time of introduction, the vendor said.

Appeals to wider range

According to Canzano, the system was rewritten to function not only on different platforms but to appeal to a wider range of customers, but also to benefit Martin Marietta.

"We can now leverage our research and development dollars. For every dollar spent, we can spread it across three platforms," he said.

"The other vendors have to make priority decisions on which system they need to improve," Canzano added.

The system is targeted at the process industry and discrete manufacturers, according to the vendor.

A version for repetitive manufacturers is currently available in the UK and will be released in the U.S. by year's end, Canzano said.

Upgrade assistance available

As part of the consulting service the vendor offers with the software, upgrade assistance to Release 3.1 will be offered, at no cost, to current users with maintenance agreements, according to Martin Marietta.

Some of the components of the MAS-Manufacturing system include Engineering Control, Manufacturing Control, Inventory Control and Purchasing Control, according to the company.

Manufacturing Engineering, Master Scheduling, Cost Generation, Cost Management and Materials Lot Tracking are also available in the system, the vendor said.

The financial applications suite is composed of General Ledger, Accounts Payable, Accounts Receivable, Customer Order Processing and Sales History, according to the company.

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 **FOCUS**
Information Builders, Inc.

Exec terminal

FROM PAGE 25

The executive information system includes several applications. The Executive Briefing Book stores a library of charts, reports, documents and menus for the individual executive. The library is updated by a mainframe-based workstation manager that downloads only documents that have been updated since the last download occurred.

Individual items in the Executive Briefing Book can be made selectable, similar to a menu choice. By going to the selected hot spots, an executive can "zoom" through a report, getting quickly from high levels of detail to lower levels of supporting detail, Barrow said.

"We take actual reports and distribute them into the PC-based local libraries so access is fast and reliable," Barrow noted. The Executive Exception Reporting capability uses color coding to highlight deviations from previously established parameters for each item at budget

numbers or sales goals.

According to Barrow, the Executive Newswire provides access to the on-line Dow Jones News Service through a menu selection process.

Execu-View is an application that is said to allow an executive to view corporate information models through windows. The models were developed as mainframe data bases using Comshare's mainframe Decumann support product. System W, Barrow noted, "Execu-View acts as a window into the corporate data base." Barrow said, adding that the product allows an executive to pose unstructured questions against the data being used in the model.

Commander Executive is available now and runs on an IBM PC AT with IBM's PC AT software. It works with Comshare's Commander EIS desktop support system running on a Digital Equipment Corp. VAX or IBM mainframe.

Five copies of the workstation come with the \$28,500 to \$77,000 VAX product. 10 copies with the \$89,500 to \$152,000 mainframe product.

Focus

FROM PAGE 25

a mainframe

Without manual translation, the broken bar used on the PC replaces the mainframe's solid bar, which states what is supposed to be one field to be read as

information Builders are hearing more and more from "sophisticated system developers" as well, added Zuk, who is the information center manager for Northwest Corp. in Minneapolis. Fuse conducts an annual ballot of user needs and narrows down the 100 most frequently mentioned items to 25, which it then submits to Information Builders.

Gerald Cohen, Information Builders' chairman, said the annual ballot result, along with other forms of user feedback, pushes his company "in three directions." He said the firm needs to address end users who want easy-to-use features; programmers who want tools to develop complicated applications and programmers using windows and other recent technology to provide easy-to-use features in end-user applications.

Information Builders said it has been forced to provide not only quality and reporting tools but also Mid-Link, one of a number of new products announced June 2, which adds both end users and programmers in building applications with windows, depending on their level of skill.

In the early years of Fuse, most items on its ballot list concentrated on service and support. Cohen acknowledged. Even PC Focus, when it came out in 1982, highlighted the company's reputation as an innovator at the expense of quality assurance. "You can't rush product to market and have quality assurance at the same time," said Zuk, a self-described vociferous complainer about Information Builders' lack of advance testing and beta test sites.

Publisher passes out revenue awards

Recognizes million-dollar products; MSA, Software AG cross \$250M line

INDIANAPOLIS — International Computer Programs, Inc. (ICP) recently announced its 16th annual software awards.

ICP, publisher of the ICP Software Directory, recognizes software products that generate \$1 million in revenue in their first year of release with its Million-One listings. It also recognizes products that have achieved \$1 million, \$5 million, \$10 million, \$25 million, \$50 million, \$100 million and \$250 million in sales during their lifetimes.

Two products have achieved the \$250 million status. The flagship product of Atlanta, Georgia-based Management Science America, Inc. is its Payroll/Personnel System, a Cobol-based package that is reportedly in use at 1,200 corporations. It reached its first million in revenue in 1979, garnered \$100 million by 1985 and reached \$250 million two years later. The other \$250 million product is Adabas, Software AG of North America, Inc.'s adaptable data base system, with 2,200 users.

First introduced in 1972, Adabas runs on both IBM mainframes and Digital Equipment Corp. VAXs and is integrated with a fourth-generation language and a data dictionary.

New products achieving Million-One status include the following

Advanced Project Workbench Release 2.2 from Applied Business Technology Corp.; Foodmanager from Applied Control Systems, Inc.; Bravo Retail Management System from Armor Systems, Inc.; Virtual Terminal 3270 Supercomputer/CKS and IMS, all from BMC Software, Inc.; and CFM/Med 300 and CICS Manager, both from Boole & Babbage, Inc.

Also, Pathwa and Retrofit, both from Peat Marwick Main & Co.; International Comprehensive Banking System, CBS Software and Newtend, Inc.; Star, Century Analysis Inc.; Trade Services Processing, Chair, Supra, Concom Systems, Inc.; Cortex, Computer Task Group, Inc.; EPIC Report & Query Generator, Computron Technologies, Inc.; CICS Playbook, Compware Corp.; CTI Systems, CTI Ltd.

Also, Construction Loan Control System from Data Select Systems, Inc.; DASOMON, Duquesne Systems, Inc.; EGCO-convert, Ergosoft Corp.; Hospital Materials Management System, Global Software, Inc.; TGRAF-07, Grafport; EZ-Letter, Group 1 Software; Intime, Incept, Inc.; SOEDS Plus, Indiana Bell; Focus for Wang VS, Information Builders, Inc.; Incompatibility, Information Science, Inc.; Pro-Information Systems of America, Inc.; Vision-MIS, In-

sureance Data Processing, Inc.; Integral Systems HRMS/38, Integral Systems; The Insurance Writer, ISI Systems, Inc.; World Distribution Systems and World Job Cost, both from J. D. Edwards & Co., Javelin, Javelin Software Corp.

Also, Executivair and Simon, both from The Kichman Corp.; Information Engineering, Knowledgeware, Inc.; USF&L, Leader, Leader Systems, Inc.; Volskriter 3, Lifetree Software, Inc.; Fastware, Logica; Finalist, LPL, Inc.; Magna & Magna Software Corp.; Synergy Desktop, Matrix Software Technology Corp.; Micro Advanced Mortgage Banking System and Muser Loan Application, both from Modular Information Systems; Oracle SQL Calc, Oracle Corp.

Also, Easytrieve Plus PC from Panosipic Systems, Inc.; Smartman 240, from Persoft, Inc.; BPS/38, Policy Management Systems Corp.; The Profitkey Custom Manufacturing System, Profitkey International, Inc.; Gen-A-Rate, Programming Resources Co.; CICS Windows, Softouch Systems, Inc.; Mipper Keys, Unisys Corp.; Via/Insight, Viasoft, Inc.; Relay Gold, VM Personal Computing, Inc.; VMoperator, VM Software, Inc.; Application Extension License, Walker Interactive Management and Reflection 3, Walker Richer and Quinn, Inc.



Gerald Cohen

two. Kantare said she would like to see this ditch rectified.

Eni, Goldfarb, manager of system development at Marriott Corp. in Bethesda, Md., said he would like Information Builders to make Focus as efficient at sorting data from IBM's IMS as is Mark IV from Sterling Software Inc. of Eastview from Panosipic Systems, Inc.

These concerns, which cover the spectrum from end users to programmers involved in production work, reflect the range of customer needs that Focus is now expected to satisfy, said Sara Zuk, president of Fuse.

"Fifty percent to 60% of their base are end users, marketing and sales type of workers," Zuk said at the meeting. But Fuse and In-

Pro-user?

FROM PAGE 25

tence of independent software companies came into being, and today we see a thriving industry based on open competition with IBM. But that was then and this is now. Goetz is charging that the Extended Edition of IBM's OS/2 represents software bundling because the data base management system and communications manager will be included in it.

These two pieces do not have to be built into the operating system. Indeed, Goetz has charged that IBM had no reason for doing so other than to exclude third-party suppliers, one of which ADR plans to become.

This claim is harder to sustain than the more clear-cut case of hardware and software bundling. IBM, which has not responded publicly to the charges, can reserve the right to say it built the DBMS and communications manager into the operating system for reasons of efficiency. This might not be automatically provable or even believable. Nevertheless, IBM has performance as a possible first line of defense against Goetz's charge.

In addition, the charge would be easier to sustain if IBM planned on offering the operating system, the DBMS and the communications manager at what has been established as the price for the operating system alone. Instead, it is charging more for the combination, leaving customers the choice of buying only the operating system. The main reason we've heard to the OS/2 Extended Edition is that it is expensive — \$795 vs. \$395 for the basic version.

Up in arms?

So it remains open to question whether the Justice Department or the rest of the software industry will get up in arms over Goetz's charge. But because the legal case is open to question doesn't mean we can't invoke another test — one provided by an IBM spokesman.

Bertrand Berland, IBM's director of strategic planning, explained IBM's renewed interest in application software markets last year by saying it was good for the industry. "I think it's healthy to stimulate competition. My experience is when we go into an area, we typically stimulate it for everybody," Berland told an ADAPSO audience in Phoenix in November 1986.

So let us ask, Was IBM's packaging of a DBMS and communications manager with an operating system designed to improve performance? Or was it designed to exploit the position of the operating system supplier. As IBM well knows, the supplier of an operating system enjoys the aura of being the best provider of subsystems. Will the OS/2 Extended Edition represent the state of the art or IBM's account control applied to the personal computer world? Walker Interactive Management stimulate competition or will it tend to eliminate third-party suppliers of PC communications managers and DBMSs?

The answers to these questions might seem obvious, but we should resist the obvious when we still don't have a date for when the Extended Edition will be available.

Nevertheless, Goetz has a point. Until a performance advantage can be illustrated in the Extended Edition, it is questionable that the package represents a real gain for users and the industry. Following "the Berland test," let's say the burden of proof is on IBM.

Reprints in Computerworld's names editor: software & services

Watch what happens next time you ask a mainframe software vendor for a complete customer list.



You may get a convincing song and dance, but underneath it's a different story. Behind those pat answers that software vendor is actually sweating and squirming.

Why don't they want you to see a complete list? Simple. They know that their size and name familiarity do not guarantee happiness. Many "single source" or "all-things-to-all-people" vendors have, at best, uneven quality across a multi-application product line. They know that their customer list may contain a good number of less-than-happy clients. It's difficult for these vendors to commit the human and monetary resources necessary to produce the type of superior product available from a firm that specializes in a single application area. A firm like Data Design.

Data Design develops mainframe financial applications software. Period. We understand all our users' requirements and are therefore able to provide the necessary support: over 40 percent of our support and installation staff are CPAs or have MBAs.

Data Design doesn't balk at giving prospective

customers a *complete* customer list. That's because hundreds of FORTUNE 1000 companies have reaped exceptional results from our financial software systems. Alcoa, Gerber, Pillsbury, Sherwin-Williams, Merrill Lynch, Bankers' Trust, Bristol-Myers, Federal Express, Litton, Lloyd's Bank, The New York Times Company, Owens-Corning, Royal Business Machines, Warner-Lambert and hundreds more have opted for Data Design over other major vendors. Write for our complete customer list and ask *anyone* on it about our fast, trouble-free implementation; system flexibility and ease of use; in-depth training and responsive, knowledgeable support; *management level* people in customer service positions, and more.

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When The Johns Hopkins University decided to launch an ambitious fund-raising campaign, its Development and Alumni Services Department decided to do something even bolder—break away from the administration's traditional mainframe environment. And go with a system from Digital.

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"A computing architecture that raised some eyebrows when it helped Johns Hopkins raise a few million dollars."

output," Vogelsang remarks. "I'm constantly faced with growth. And Digital's open architecture lets me add on whatever I need."

How successful is the department? According to Vogelsang, "We've cut response time from three weeks to three days. And when needed, to three hours. In fact, we've tripled the work processed. Now, we have time to branch out into event management, alumni networking. Even a little PR."

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NEW PRODUCTS

Systems software

Adrem, Inc. has enhanced its Address on-line data entry and verification system to allow users to create their own data entry screens and menus and customize them to meet individual needs and functions.

In addition, users can begin the data entry process by selecting an application name and pressing a program function key. Also, users have the capability to define both field prompts and automatic Help screens. According to the vendor, Address can directly interface with security products such as IBM's Resource Ac-

cess Control Facility and Computer Associates International, Inc.'s Top Secret Address operates on IBM mainframe operating systems from SSX to Extended Architecture. It also operates in native IBM VM mode. License fees range from \$19,500 to \$24,000.

Adrem, 1 Hollis St., Wellesley Mass 02181.

Applications packages

Decision Graphics, Inc. has announced PEAC 2000, a version of its computer-aided design and drafting and facility management/space planning soft-

ware designed to operate on Digital Equipment Corp.'s Microvax 2000.

PEAC 2000 includes software modules for existing drawing conversion, schematic design, space planning, floor plan and detail drafting and inventory management.

PEAC 2000 costs \$10,800 per workstation.

Decision Graphics, Two Westboro Business Park, 200 Friberg Pkwy., Westboro, Mass. 01581

Languages

Speakeasy, an interactive computer language featuring basic word commands and natural mathematical notation, has been enhanced to include *Grapheasy*, a

modular tool kit that provides a method for producing graphs on various devices. Strategic Information has announced.

Developed by Speakeasy Computing Corp., *Grapheasy* allows users to create pie charts, bar charts and line plots with shading and hatching of drawn figures.

An annual mainframe license for Speakeasy costs \$7,000. The micro version costs \$975.

Strategic Information, 80 Blanchard Road, Burlington, Mass. 01803

Utilities

VM Software, Inc. has announced VMbatch Release 1.1.

VMbatch Release 1.1 is said to offer interconnected VM system support, a VM batch/tape interface and improved command and Help screens. The interconnected VM system support utilizes IBM's Remote Spooling Communication Subsystem, enabling users to list, change, cancel and remove remotely submitted jobs.

VMbatch is priced at \$9,000.

VM Software, 1800 Alexander Bell Drive, Reston, Va. 22091.

Services

A service designed to provide users of IBM's Information Network with simplified access to commercial data bases has been introduced by IBM.

DB-View is said to operate with a range of data bases that share information in structured formats. It features software that allows users to search multiple data bases, electronic transmission of data updates to keep information timely and unifies that assist in data management tasks. There are also transfer functions that allow the results of searches to be sent to decision-support programs.

Data bases currently supported include Standard & Poor's Corp.'s Compustat Services, Inc.'s Compustat; Wright Investors' Services Worldscope and Gregg Corp.'s Tradeline.

IBM said DB-View will be available in the third quarter. It costs \$15,000 and carries a monthly license fee of \$5,000. IBM, 3101 W. Buffalo, Tampa, Fla. 33607.

Development tools

Online/Database Software, Inc. has unbundled its The Application Builder (TAB) Development Workstation into several products.

TAB/Central is a personal computer-based data base management system that is said to be compatible with Cullinet Software, Inc.'s IDMS/R and Integrated Data Dictionary. It is priced at \$3,000.

TAB/4GL is a fourth-generation application development environment compatible with Cullinet's ADS/Online Mapping. It is priced at \$2,000. TAB/Cobol, a Cobol application development environment providing batch capabilities using Cullinet's IDMS/R DML, costs \$1,000.

TAB/Cobol-DC, a Cobol application development environment with screen printing and on-line application development commands, is compatible with Cullinet's IDMS-DC teleprocessing monitor and sells for \$500. TAB/Cobol-CICS is the same as TAB/Cobol-DC but is compatible with IBM's CICS teleprocessing monitor. It is priced at \$1,000.

Online/Database Software, One Blue Hill Plaza, Pearl River, N.Y. 10965.

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MICROCOMPUTING

SMALL TALK



William Zachmann

Picture Windows

One of the best aspects of IBM's Personal System/2 series is the tremendous boost it gives to capable graphics on ordinary business systems. The 640- by 480-pixel, 16-color resolution of NEC Corp.'s video graphics array (VGA) on the PS/2 Models 50, 60 and 80 makes it possible to build Macintosh-like graphical interfaces for Microsoft Corp.'s MS-DOS and IBM's PC-DOS as well as for IBM's OS/2.

Happily, 640- by 480-pixel graphics products that are equivalent to IBM's VGA are already available when you combine products like Video-7, Inc.'s Vega Deluxe or Quadram Corp.'s Prosync cards with multiscan monitors such as the one from NEC.

As a result of the improved graphics, but also because of its incorporation in an updated version of OS/2 as the OS/2 Presentation Manager, Microsoft's Windows is poised to become a major factor in the business use of microcomputers.

Micrografix, Inc., based in Richardson, Texas, was one of

Continued on page 35

Micros offer 3270 option swap

Memorex line can be customized for host access or expanded storage

BY ED STANN
© 1987

MILPITAS, Calif. — Memorex Corp. last week introduced a series of microcomputers that it said enable users to mix and match features for applications involving IBM 3270 host communication and file transfer or expanded storage capabilities for large files.

The three systems that make up the Memorex 7000 series Personal System family can be customized by users at the time of the initial order or at a later date, Memorex said.

The 7000 family includes the 7088, a 10-MHz Intel Corp. 8088-based system that Memorex said is compatible with IBM's Personal Computer XT; the 7188, another 8088-based machine that runs at 8 MHz and is also XT compatible; and the 7186, an Intel 80286-based system compatible with IBM's PC AT.

In addition to the 7000 series, Memorex unveiled last week four 3270-compatible terminals and two cluster controllers that it said support a number of terminals, including one that is a plug-compatible alternative to

IBM's 3174-81R and is fully compatible with IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC). SNA/25 and Binary Synchronous Communications communications modes.

The strategic purpose of the 7000 series is not to get into the clone business, according to Colin Bruce, Memorex's marketing director, but to use the systems to best leverage its expertise in 3270-type communications.

"We've been in that business about as long as IBM," Bruce said.

Continued on page 34

Lotus shuffles deck; Digate heads software

BY DOUGLAS BARNEY
© 1987

CAMBRIDGE, Mass. — In an effort to unify its software development and business planning, Lotus Development Corp. recently reorganized its executive staff.

As a result of the reorganization, Charles J. Digate is responsible for all software products. "The development teams of all software products are working in product groups that report directly to Digate," a Lotus spokesman said.

Five of Lotus's software business units now report to Digate. The Analytic Products Group is a new group that includes both the Business Products Division (Lotus's 1-2-3, Symphony and

companion products) and the Advanced Products Division.

Other groups that report to Digate are Lotus's Engineering and Scientific Products Project (Lotus Measure), Graphics and Document Processing (FreeLance and Manuscript), Communications (Lotus Express) and the Mainframe Software (TAC and 1-2-3/M). The Information Systems Division, managing products such as Lotus Signal, which provides data for Lotus users, is now the responsibility of Michael Kolowich, who retains his position as vice-president of marketing.

Ed Belove, corporate vice-president of research and development, is now also responsible for business development, including the negotiations of merg-

ers and acquisitions.

Lotus also has a new chief financial officer to replace E. C. "Mick" Prokopis, who resigned last week after 27 months on the job.

Robert P. Schechter was appointed vice-president of finance and operations and chief financial officer last week after working with Lotus as managing partner for Coopers & Lybrand's technology group.

Thirty-nine-year-old Schechter will be responsible for Lotus's legal and investor relations, finances and worldwide manufacturing.

Despite the reorganization, Lotus said Jim Manz plans to maintain his role as chairman, president and chief executive officer of Lotus.

MS-DOS pulled over 640K wall

BY DAVID BRIGHT
© 1987

CAMBRIDGE, Mass. — While some software vendors broke the 640K byte memory barrier by writing operating systems compatible with Microsoft Corp.'s MS-DOS, AI Architects, Inc. chose a different tactic — developing protected-mode extensions to MS-DOS.

The company said it hopes to sell its OS/286 and OS/386 extensions to applications developers targeting users of IBM Personal Computer AT-class machines and Intel Corp. 80386-based systems. When the extensions are added to real-mode applications by developers, the programs can then take advantage of the Intel 80286 chip's protected mode or the native 32-bit mode of the 80386, said company President Tom Spalding. Because the extensions will be

Continued on page 35

Inside

- ◆ Datamedia offers a diskless IBM PC-compatible workstation. Page 34.
- ◆ Rodime starts shipping its high-capacity internal hard disk drives for Macintosh SE and II PCs. Page 35.
- ◆ Lotus ports its PC Interface to Xerox 2.2 and Unix 4.3. Page 35.

For COBOL developers - OS/2 Now

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Dual-function terminal debuts

NASHUA, N.H. — A diskless IBM Personal Computer-compatible workstation that doubles as a Digital Equipment Corp. VT240-compatible terminal was announced by Datamedia Corp. last week.

Datamedia, which makes workstations and multiuser systems for OEMs, said it hopes to sell the new Coloscan/2 unit to OEMs and corporate systems integrators as an alternative to DEC's Vaxmate personal computer or VT240 in environments where access to several information sources is required.

Prices on the new unit start at \$2,000, while the Vaxmate, which includes a built-in Ethernet local-area network interface,

starts at \$4,065. The Coloscan/2 undercuts the Vaxmate prices in all cases, even when third-party networking equipment is added, claimed Guy Danello, Datamedia's president. The ability to easily configure the workstation will play an important role in the workstation's success, Danello said.

Exercising the options

The Coloscan/2 can be configured with several storage options, including a memory board used as a random-access memory (RAM) disk and an external subsystem with a 3½-in. floppy disk drive as well as a 20-M-byte hard disk drive and a credit-

card-size, nonvolatile device called Cardfile.

The battery-backed RAM disk, available with up to 2M bytes of memory, can also be used to run Microsoft's Windows without the common delays caused by hard-disk access.

Built around a NEC Corp. V30 chip—which is compatible with Intel Corp.'s 8086—the machine includes two IBM PC XT-compatible expansion slots, two RS-232 ports for simultaneous communications with two hosts, a parallel printer port and 768K bytes of dynamic RAM. Users of the system can simultaneously run host and PC applications.

"To the best of our knowledge, the system is 100% compatible with the IBM PC," Danello said.

Memorex

CONTINUED FROM PAGE 33

Memorex provides several ways to use 3270 communications and applications through its optional 3270 Connection feature. This option is said to allow a 7000 series system to be hooked up to either a Memorex or IBM cluster controller.

Memorex is also offering users several other options, including the ability to emulate IBM's 3270 PC and 3279 S3C color graphics and the ability to transfer files from the host to any 7000 series system.

Each 7000 series system has 640K bytes of random-access memory, a 5¼-in., 360K-byte disk drive, an integrated disk controller and video adapter, a clock/calendar with battery backup, a socket for a math coprocessor and serial and parallel I/O ports.

Choice of monitors, keyboards

Users have a choice of three monitors in high-resolution green or amber monochrome phosphor or IBM Enhanced Graphics Adapter-compatible color and three types of keyboards, including an 84-key PC AT-style unit, a 101-key enhanced model and a 122-key 3270 PC-style model.

Prices for the series range from \$1,275 for the basic 7088 to \$3,250 for the fully configured 7186. First shipments of the series are scheduled for August, the vendor said.

Memorex's 3270-compatible terminals include two with features and performance benefits Memorex said surpass equivalent IBM displays and two that enhance existing Memorex models.

The 2391 Display Station is intended to be a replacement for IBM's 3391. The terminal has a screen size of 14 in. and a footprint of 13 by 13½ in. It attaches to either a Memorex or IBM cluster controller.

The Memorex 2192 Display Family consists of three models, all of which are plug-compatible alternatives to IBM's 3192.

With these models, the 2192-C, 2192-D and 2192-DS, Memorex is attempting to "raise the dumb terminal into the area of a processing terminal, which is something IBM has done," Bruce said.

As an example of this increased intelligence, the 2391-DS, for example, has PC-like features such as copy and paste and the ability to present two full screens as opposed to windows, Bruce said.

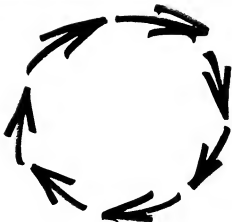
Two full screens allow better access to data in applications such as those typically found in businesses, such as insurance companies, in which clerks can display a customer's files side by side next to a claim report, he noted.

Prices of the four terminals range from \$1,325 for the 2391 to the 2192-DS's price tag of \$2,295. Initial shipments of all four units are expected to begin next month.

The Memorex 2374-4R and 2374-82R cluster controllers work with a variety of terminals, such as Control Unit Terminals, Distributed Functional Terminals and Downstream Load devices, according to Memorex.

Memorex said both products are compatible with the 7000 series and are plug compatible with SNA/SDLC, SNA/X.25 and BSC communications modes.

Memorex said both units will be available in September and will carry a list price of \$3,450.



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MS-DOS

FROM PAGE 33

meled to individual applications, one program's extension cannot be used to support other applications.

Since the extensions use the existing MS-DOS interface and were designed for existing machines, Spalding said, they will not compete with Microsoft's MS OS/2 operating system. "Our approach is to fix the old DOS and not start all over again," Spalding stated.

OS/2 and other MS-DOS alternatives such as Software Link, Inc.'s PC-MOS/386 operating system offer multitasking, but AI Architects' products do not. The main advantage of the extensions is that they allow 80286-based machines to address up to 15M bytes of memory and 80386-based systems to address up to 4G bytes while running the applications on the latter machines 2½ times faster than nonmodified applications, Spalding said.

Tailor-made

To change an MS-DOS program to a 32-bit program for the 80386, a developer need only recompile the application, Spalding explained. An application can be tailored to the 80286's protected mode through reinking. In a worst-case scenario, he said, converting a real-mode application should take about three weeks. One early user made the conversion overnight, he added.

Although programs run faster when converted to the 80386's 32-bit native mode, those converted to the 80286's protected mode typically run about 15% slower. Spalding said, but he said the programs still run twice as fast as those employing the Lotus/Intel/Microsoft Expanded Memory Specification.

AI Architects said it is initially targeting the software to vendors of such memory-intensive applications as computer-aided design, artificial intelligence and desktop publishing.

The extensions, which were announced last week, were derived from the company's work on an 80386-based add-in board, called the Hummingboard, for artificial intelligence applications. Since the board, which is sold by Gold Hill Computers, Inc., includes up to 24M bytes of on-board memory, AI Architects developed software for addressing the extra memory. AI Architects developed software for addressing the extra memory.

Phar Lap Software, Inc. in Cambridge also makes a tool for developing 80386-based programs that break the MS-DOS memory barrier.

A Developer's Toolkit, which includes the OS/286 and OS/386 kernels, a linker, symbolic debugger and command processor, is priced at \$495.

Ideassociates board ties PS/2, IBM minis

BILLERICA, Mass. — Ideassociates, Inc. recently said it will begin shipments next month of an add-in board that links IBM Personal System/2s with System/34, 36 and 38 minicomputers.

Called the Ideacom 5251/MC, the \$895 board uses twinaxial cable to connect PS/2 Models 50 and 60 to remote controllers, according to Ideassociates. Surface-mount technology was used to develop a board that would fit into the small slots in the PS/2's Micro Channel architecture, a company spokesman said.

The board is said to provide emulation of IBM's 3180, 5251 Model 11, 5291 and 5292 Model 2 terminals and to work with either a color or monochrome monitor. In 3180 emulation mode, the board is said to support 132 columns for the viewing of large documents; in 5292

emulation mode, it runs System/34, 36 and 38 graphics programs, including the IBM Business Graphics Utility programs.

The board is said to be capable of running as many as four host sessions concurrently in windows, allowing users to switch between Microsoft Corp.'s MS-DOS-compatible sessions and the host sessions.

According to Ideassociates, most PC parallel or serial printers can emulate IBM 5224, 5225, 5226 printers as well as the 5219 letter-quality printer when the board is installed in a PS/2.

The board's software includes a screen-capture function, which transfers screen information directly to a disk file if a printer is not available. Also included is automatic status identification for helping devices to get on-line quickly, Ideassociates said.

Prior experience with Micrograph's software is by no means a requirement for successfully learning and using Windows Graph.

Novices welcome

Effective use of the pull-down menus, dialogue boxes and other user interface facilities of Windows make Windows Graph remarkably friendly and accessible to the average user.

A straightforward work sheet facility, which appears in an overlaid window, provides the basis for entering or import-

Windows

FROM PAGE 33

the first PC software vendors to join the Windows camp. In-A-Vision, Micrograph's computer-aided design package, was the first major Windows application to be marketed. It is probably the most widely used independently developed Windows application to date.

The new frontier

While Micrograph's experience has proved to some extent the adage that pioneers are usually the ones who get the arrows in their backs, things appear to be moving in the direction Micrograph pioneered. Windows — or the PS/2 Presentation Manager, which is its most advanced form — has not only become the focus of a lot of software development activity but is gaining growing acceptance from users.

Having followed up In-A-Vision with the highly rated Windows Draw, Micrograph's proclaimed intention is to become a leader in bringing Macintosh-like capabilities to DOS and OS/2 PCs. Windows Graph is the company's latest step in this direction. It is an attractive program for producing business graphs from numerical data.

Windows Graph uses a considerable part of the basic program facilities developed for Micrograph's earlier programs. The look and feel of the program are very similar. As with the Macintosh, users of the earlier products will find that they are quickly able to master Windows Graph.

MICRO-GRAFEX's experience has proved to some extent the adage that pioneers are usually the ones who get the arrows in their backs.

ing data into Windows Graph. It behaves more or less as you would expect a spreadsheet to, although it doesn't have the range of numerical manipulation capabilities of a typical spreadsheet program.

Its data manipulation capabilities include simple calculations and the ability to sort data along a single row or column.

Fundamentally, however, the work sheet facilities of Windows Graph are a way to provide data from which to create graphs. Besides accepting direct entry of data from the keyboard and from data files in its

High-capacity drives out

Rodime 45M-, 102M-byte units fit Apollo, Mac

CLEVELAND — Rodime, Inc. recently began shipping the first units of its high-capacity internal hard disk drives for Apple Computer, Inc. Macintosh SE and Macintosh II personal computers.

The company's Peripheral Systems Division announced that it has started shipping a 45M-byte disk drive that fits into either machine and a 102M-byte drive for the Macintosh II.

The company reportedly plans to have a 140M-byte drive available for the Macintosh II in July.

To save space, all three drives include embedded small computer systems interface controllers.

Each unit has an average seek

time of 28 msec.

The 45M-byte Rodime 450 RX drive priced at \$1,595, is installed in the same manner as Apple's drives, with a mounting bracket and 50-pin connector, the company said.

Rodime said it expects the larger drives to be used in such high-storage applications as desktop publishing and computer-aided design and engineering.

The Rodime 1000 RX and larger Rodime 1400 RX drives are priced at \$2,995 and \$3,495, respectively.

Although Rodime's parent company, Rodime PLC in Glenrothes, Scotland, sells drives to OEMs, the new Macintosh drives will be sold directly to resellers, Rodime said.

Locus ports to Unix, Xenix

WASHINGTON, D.C. — Locus Computing Corp. recently announced it has ported its PC-interface to Microsoft Corp.'s Xenix 2.2 and University of California at Berkeley's Unix 4.3 operating systems.

Support for these systems signifies that Locus is now covering the majority of the Unix marketplace, said Michael Lewis, director of marketing and sales.

Among the environments supported under the latest release of PC-Interface are the Digital Equipment Corp. MicroVax II Series 700, the NCR Corp. Tower 5000, the IBM Personal Computer AT and the Unisys

Corp. Tower

Also announced was the availability of technical support materials, such as Unisys's Tower and Arete Systems Corp.'s user documentation, to accommodate these new interfaces.

PC-Interface provides users transparent access to Xenix or Unix files and processing power from a variety of Microsoft MS-DOS-based personal computers. Locus said PCs are bridged to Unix-based minis and micros via RS-232C or Ethernet.

PC-Interface offers data and program file sharing, processor and printer services, network security and DEC VT100 terminal emulation for PC users.

own format, the worksheet facility will also read the more widely used work sheet formats directly.

Creating basic graphs is as simple as highlighting data within the spreadsheet and selecting one of the graph formats from the Gallery entry in the main menu of the program. Default settings make it easy to create a variety of pie charts as well as tables.

The most impressive aspect of Windows Graph is the powerful set of facilities that can be used to dress up basic graphs created with the default settings. Adding text, creating three-dimensional projection graphs and changing fonts and styles of text are some of the many ways of manipulating the look of a graph.

Know one's limitations

The main limitations the program has are essentially those of Windows. The most important limitation is a continued lack of drivers for all the output devices users typically want to em-

ploy. For example, as yet there is no support for any of the devices for creating output on 35mm slides.

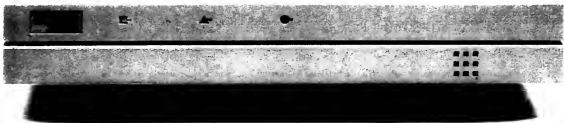
With a list price of \$395, Windows Graph is not exactly a price leader in PC software. It is not copy-protected, however, and it comes complete with a runtime version of Microsoft's Windows.

While it is not necessary, I recommend an Intel Corp. 80286- or 80386-based system with at least 640K bytes of memory, a hard disk, a mouse or other input device in addition to the keyboard and an IBM Enhanced Graphics Adapter (EGA), enhanced VGA or VGA adapter for practical use. Obviously, an appropriate printer or plotter will also be required.

Windows Graph is a high-quality product delivering solid value. If it is another good reason that we're likely to be hearing a lot more about Micrograph in the future.

Zachman is vice-president of trend:ix or International Data Corp.

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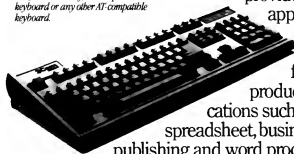
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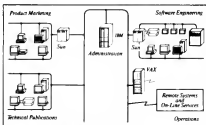
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With PC-NFS, PC users can transparently access all the computer resources in the company, across different operating systems, different software, even different networks.



The network *is* the computer.

NEW PRODUCTS

Systems

An IBM Personal Computer XT-compatible offering a componentless motherboard and an eight-slot, mainframe-style open bus, has been introduced by **Innovation Computer Corp.**

Designed so that no circuits or components are mounted on the bus board, the 1010XT features dual 4- and 8-MHz operation; automatic memory size, disk drive quantity and CRT type determination; on-screen diagnostics; 360K-byte disk controller; and PC AT-style keyboard.

It comes with any combination of one or two floppy drives, 256K, 512K or 640K bytes of random-access memory, 20M-byte hard drive and monochrome or color graphics adapter monitor.

Standard configurations of the 1010XT include a single floppy disk drive with no monitor for \$715 and one floppy disk drive with 20M-byte hard drive with optional monitor for \$1,429.

Innovation Computer, 1325 Juniper St., Cleveland, Wis. 53015.

Software applications packages

ZSoft Corp. has unveiled **Publisher's Type Foundry**, a Microsoft Corp. Windows software application for use in electronic publishing.

Publisher's Type Foundry is said to enable users to create or capture type fonts, logos and special symbols, modify them to 1 pixel resolution and download them to laser printers and Adobe Systems, Inc.'s Postscript devices. It consists of a bit-map editor, an outline editor and conversion utilities that link the software to I/O devices.

The program can accept typeface from sources such as PC Paintbrush Plus, which allows users to draw freehand or scan from paper. Purchased fonts from disk can also be loaded.

Publisher's Type Foundry costs \$495. ZSoft, Suite A-495, 1950 Spectrum Circle, Marietta, Ga. 30067.

Software languages

Version 2.4 of Ryan-McFarland Corp.'s ANSI 77 optimizing Fortran, RM/Fortran, includes RM/Fortran, a complete software development environment, the vendor has announced.

Other enhancements include a syntax-checking only capability, a math co-processor emulation library, improved interlanguage communication and enhanced documentation. The emulator enables programmers to handle mainframe-type floating-point arithmetic without installing an Intel Corp. 8087/80287 coprocessor chip on their machines.

RM/Fortran Version 2.4 with RM/Forte is priced at \$595. Registered users of RM/Fortran may upgrade for \$150.

Ryan-McFarland, 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

Software utilities

Macropac International has unveiled 101 **Macros for Supercalc4**, a collection of keystroke savers, shortcuts and

utilities for use with Computer Associates International, Inc.'s Supercalc4.

Features of 101 Macros for Supercalc4 include macros that eliminate repetitive keystrokes and complicated menu selections, speed up recalculation time, add menu-driven financial formulas and math functions, provide a search-and-replace feature and automate the steps for data base manipulation, according to the vendor.

101 Macros for Supercalc4 is priced at \$69.95.

Macropac International, Suite 168, 19855 Stevens Creek Blvd., Cupertino, Calif. 95014.

Development tools

Sage Software, Inc. has announced the **APS/PC Painters** and **APS PC/MVS Link**.

The APS/PC Painters are interactive tools for the design, development and prototyping of commercial application systems. APS PC/MVS Link provides automated communication between the personal computer workstation and the MVS-based host processor. It enables transparent dictionary-to-dictionary communication of application-systems entities between the APS/PC Painters and the mainframe. It is a VTAM application that also provides check-in and check-out functions during the transfer process.

The APS/PC Painters are priced at \$3,500 for a single-copy. APS PC/MVS costs \$15,000 per mainframe CPU.

Sage Software, 3200 Monroe St., Rockville, Md. 20852.

Software enhancements

Database International, Inc. has announced **Graftalk Version 5.0**, an enhanced version of its graphics software program.

Version 5.0 features standard charting options as well as data-driven graphics, a command language with more than 200 commands, a program editor and the ability to be integrated with the vendor's other

Continued on page 40

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Continued from page 39

er Database software programs. Database Graftalk is available on either 5¼- or 3½-in. diskettes. Drivers with the IBM PS/2 MCGA and VGA graphics boards are included.

Graftalk Version 5.0 costs \$395. Current Graftalk users can upgrade for \$95.

Database International, 12 Cambridge Drive, Trumbull, Conn. 06611

Data storage

Ideasociates, Inc. has introduced **Ideatape**, a 60M-byte tape drive featuring IBM Personal Computer compatibility.

Ideatape is available in external and internal configurations. It is said to enable

multiple backups to be stored on a single tape and to allow different types of backups, such as image-based or file-by-file, to reside on the same tape.

The vendor said Ideatape performs automatic backup of files scheduled in advance. Users can restore selected files from the image backup as well as perform image and file-by-file restore.

The internal configuration of Ideatape is priced at \$1,775. The external drive costs \$2,395.

Ideasociates, 29 Dunham Road, Billerica, Mass. 01821.

Printers/Platters/Peripherals

Copal U.S.A. has unveiled the **WH**

6800, a seven-color, wide-carriage dot matrix printer, and the **WH 6700** one-color printer.

Both printers feature a 24-pin head and full 136-col printing and operate at print speeds of 255 char./sec. in business mode and 85 char./sec. in letter-quality mode. They also feature a front-panel console permitting user programming of functions such as letter-quality printing, choice of type styles and font selection.

Printer accessories include a single-bin automatic cut-sheet feeder, font cards for Italic and Gothic typefaces and a 32K-byte buffer.

The WH 6700 and 6800 cost \$995 and \$1,145, respectively.

Copal, #105, 2291 205th St., Torrance, Calif. 90501.

Acer Technologies Corp., an affiliate of Multitech Electronics, Inc., has introduced the **Acer LP-75** desktop laser printer.

The printer is said to provide 1.5M bytes of memory for a full page of graphics. It offers a 6 page/min. text-resolution print speed and is compatible with the Hewlett-Packard Co. Laserjet Series II printer.

The product can draw vector graphics as well as produce diagrams, charts and graphs, according to the vendor. Built-in graphics features are said to include a gray scale for shading and a ruling feature.

The printer comes with nine resident fonts and a 150-page output bin.

The Acer LP-75 is priced at \$2,595. Acer Technologies, 401 Charcot Ave., San Jose, Calif. 95131.

Board-level devices

Metabyte Corp. has announced the **DAS-20**, an analog and digital I/O board for IBM Personal Computers and compatibles.



Metabyte's DAS-20 I/O board

The DAS-20 plugs into any expansion slot in the PC. It includes 16 single-ended or eight differential analog input channels with software-programmable input ranges. It uses a 12-bit analog-to-digital converter and features a 2M-byte queuing random-access memory.

The DAS-20 also provides two channels of 12-bit resolution analog outputs; 16 bits of parallel, logic-level, digital I/O; a counter-timer chip; and two channels of counter timer for external connections. Software includes an assembly-level driver and installation and test programs.

The DAS-20 costs \$1,495.

Metabyte, 440 Myles Standish Blvd., Taunton, Mass. 02780.

Heurikon Corp. has introduced the **HK68/M120** Multibus I single-board microcomputer based on the Motorola, Inc. 68020.

The HK68/M120 offers up to 25 MHz of 68020 central processing, up to 4M bytes of on-board dynamic random-access memory (RAM), 128 bytes of nonvolatile RAM, up to 256K bytes of erasable programmable read-only memory, two RS-232 serial ports and an ANSI-compatible small computer systems interface.

Operating systems supported for the HK68/M120 include Unisoft Corp.'s Unibus AT&T Unix System V, Release 2-compatible operating system, Hunter & Ready, Inc.'s VRTX Real Time Executive, Microvare Systems Corp.'s OS-9 and Software Components Group, Inc.'s PSOS.

The HK68/M120 is priced from \$1,995 with 1M byte of dynamic RAM. Heurikon, 3201 Latham Drive, Madison, Wis. 53713.

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NETWORKING

DATA STREAM



Unix users shun OSI

The Unix community — a group of stubborn and opinionated techies types if ever there was one — has been thumbing its nose at the slowly progressing Open Systems Interconnect (OSI) networking standard, preferring to stick with the tried-and-true Transmission Control Protocol/Internet Protocol (TCP/IP). Right now, this seems justified.

After all, TCP/IP networking protocols have been around a long time, enjoying the support of the Department of Defense, a mighty contractor. And in the past year, third-party networking vendors such as Ungermann-Bass, Inc., Excelan, Inc. and Microm-Interlan, Inc. have been introducing a veritable slew of TCP/IP products that network not only Unix systems but also everything from IBM Personal Computers to Digital Equipment Corp. VAXs.

In contrast, the OSI standards effort seems to be awash in dueling vendors, thwarted by the need to address a bewildering array of industry-specific

Continued on page 43

Token-Ring shortage to ease

IBM beefs up production efforts to meet demand for adapter cards

BY PATRICIA KEEFE
CW STAFF

NEW YORK — IBM is taking steps to ease the shortage of Token-Ring boards, said Ellen Hancock, president of IBM's Communications Products Division, in an interview here. The adapter cards have been in short supply since they first began shipping 15 months ago.

IBM is both adding workers to the production line and trying to increase its production output, Hancock said.

However, IBM would not pinpoint when it expects the cards

to be available in volume.

"We are trying to react to demand," Hancock said, adding that IBM has been pleasantly surprised by the substantial demand for Token-Ring products. She said two-thirds of IBM's largest customers have installed the Token-Ring. Acknowledging that other customers have been inconvenienced by the shortage, she said, "We intend to fix that."

Still rare

Dealers who were contacted by *Computerworld* reported that Token-Ring boards are still in short supply. As a result, some

dealers have stopped recommending IBM's Token-Ring and are steering clients toward networks from third parties such as Novell, Inc., 3Com Corp. and Banyan Systems, Inc.

"I have specifically steered people onto [3Com's] Etherlink because we can't get the [IBM Token-Ring] card," said Robert Nash, regional support manager for Dardick Corp., a Virginia-based reseller. "The word I get from our IBM reps is that they can't control the supply."

Even shops traditionally true to IBM are circumventing the

Continued on page 42

IBM cool on Novell?

BY PATRICIA KEEFE
CW STAFF

ANALYSIS

IBM's willingness to hawk Novell, Inc.'s Advanced Network software to business customers may be on the wane.

A consultant who is working with a client on a very large Token-Ring network said IBM representatives have shown him internal memorandums telling direct sales personnel to push IBM's own PC Network program in place of Novell's Network.

A spokesman for IBM declined to comment, other than to say, "It is IBM's policy not to disparage any competitor in any way."

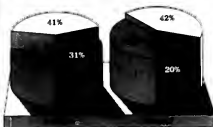
IBM has a formal agreement with Novell to bundle Network with IBM network hardware and educational software for sale to the education market. There is no such agreement targeting the business market, but IBM's direct sales personnel have suc-

Continued on page 42

Data View

Network control systems:
installed vs. planned

Fewer \$5 million+ systems, more systems below \$1 million planned



● \$1M

○ \$1M to \$4.99M

● \$5M+

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW COUNT: MITCHELL J. HAYES

Codenoll presents fiber link

BY ALAN ALPER
CW STAFF

NEW YORK — Codenoll Technology Corp. recently unveiled an add-in board for IBM Personal Computers and compatibles said to connect PCs to an Ungermann-Bass, Inc. Arcnet network via fiber-optic cable.

The Codenoll Fiber Optic Arcnet (CFOA) board is in production and lists for \$695. It is scheduled to be marketed by the Yonkers, N.Y., firm's resellers.

Continued on page 42

Inside

- IBM's Netview Release 2 increases communications abilities. Page 43
- Tokenex matches entry-level data network. Page 44
- Microm adds bidirectional three-speed dial-up modem. Page 44

MAINFRAME
`printf("Hello, world\n");`

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your programming investment across operating environments. Virtually every new computer supports C, and portable programs created with the mainframe compiler under OS or CMS will run on any other machine with a C compiler

The mainframe compiler uses standard IBM linkage conventions. Assembly programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDGM can be invoked directly from C

And you can use C, instead of assembler, to develop small and fast subroutines called from other languages

We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs

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Novell

CONTINUED FROM PAGE 41

cessfully sold Netware into that market for at least a year.

At one point last year, an IBM spokesman confirmed Novell's claims that the bulk of IBM's Netware sales were to the business market.

When asked whether he was aware of any recent change in attitude at IBM, Craig Burton, Novell's vice-president of corporate development, said he was not but added that he "wouldn't be surprised if there was a change."

A number of network analysts echoed Burton's comments, noting that it is only natural for IBM to push its own products.

But this has not always been the case in networking for IBM.

IBM sold Netware to business customers who refused to purchase IBM's network software, the PC Network program, which has been heavily criticized on performance issues. But IBM's second revision of the PC Network program, announced April 2, offers significantly improved disk I/O throughput, and IBM may feel compelled to support that revision, observers said.

Tactical relationship

"IBM's relationship with Novell is tactical, rather than strategic," said David Terrie, editor of Patricia Seybold's "Network Monitor" newsletter.

Analysts added that it is embarrassing

for IBM to sell Netware to its business customers, especially now, when it is trying to create an image as the one vendor providing a complete telecommunications strategy—a theme repeated throughout IBM's announcement of connectivity products two weeks ago.

Claire Fleig, director of research for the International Technology Group in Palo Alto, Calif., said it would not be surprising for IBM to stop pushing Netware to businesses.

"Part of it is more strategic positioning by IBM to really become identified as a full-service communications supplier," Fleig added. IBM's T1 and Netview announcements last week were part of that drive, she said.

However, some consultants and deal-

ers said that the PC Network program is still too slow and, thus, is unacceptable to many clients.

"Most people I've talked with in larger companies are in no way, shape or form going to buy IBM's network program," said Robert Nash, regional support manager for Dardick Corp. in Virginia.

"It's because of performance, mail and security issues," Nash said. "IBM's stuff is not that good."

Although the latest revision of IBM's network software, Version 1.20, supports the Token Ring Personal System/2 adapters and increases disk performance, speeding up the overall throughput, it still provides single-tasking I/O to the drive, whereas software from Novell and 3Com Corp. provide multitasking I/O.

Codenoll

CONTINUED FROM PAGE 41

At \$700 per connection, users no longer have to pay a heavy premium for networks that use fiber-optic cable, said Michael Coden, Codenoll's president.

Archnet using traditional copper cable runs at about \$550 per connection. Coden said. Fiber-optic cable, however, costs about \$1.35 per foot, compared with coaxial cable, which costs about 60 cents per foot.

The CFOA system uses a star cabling topology and token-passing bus, providing higher reliability than networks using coaxial cable. Coden claimed. A malfunctioning workstation can be unplugged without bringing down the whole network, he pointed out.

The add-in board is the first product to result from a strategic alliance between Codenoll, which manufactures the optical transceiver, and Standard Microsystems Corp. in Hightstown, N.J., which produces the interface to Datapoint Corp.'s Archnet.

Token-Ring

CONTINUED FROM PAGE 41

vendor and putting in alternative products. Nash said. Dardick recently helped a client in the financial sector convert from an IBM PC Network to a network mixing Novell software and 3Com hardware.

While Hancock assured users that they will see an increase in availability of Token-Ring boards, she said IBM intends to "stay with the current speed" of 4M bits for now.

Hancock denied reports that IBM's decision not to release a 16M-bit card was related to reports that Token-Ring patent holder Olof Soderstrom wishes to renegotiate the licensing agreement he has with IBM.



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Association for Retarded Citizens

Unix users

CONTINUED FROM PAGE 41

communications needs. "OSI is a model on which you can hang a dismaying large number of protocols," says Alan Nemeth, president of the Unix Users Association, a Unix users group. At the recent Unix annual summer conference, TCP/IP was clearly the networking protocol of choice. Even IBM was promoting TCP/IP, albeit primarily as a way to link its Unix-based RT Personal Computer. Few, if any, OSI products appeared on the exhibit floor.

However, this state of affairs may change. The Defense Department has announced its intentions of standardizing

around OSI instead of TCP/IP. And while the OSI standards bodies have pretty much agreed on a distributed file system, the Unix community is still debating the relative merits of at least three such systems: AT&T's Remote File System (RFS), Sun Microsystems, Inc.'s Network File System (NFS) and OSI FTAM.

A distributed file system is a crucial element of most networks. "With TCP/IP, I can do the same things on a variety of Unix machines, but there are different ways to call up that functionality on each type of system," complains Brian Moran, a systems programmer for Mirror Systems, Inc. Nontechnical users in administration and other departments need a user-friendly liaison between themselves

and both TCP/IP and Unix, Moran says. For this reason, Mirror is looking at NFS as a way to provide transparent access across different networked systems.

Despite its strong backing among users and vendors, there is no guarantee that NFS will become the distributed file system for Unix. AT&T nominally supports NFS but is selling RFS hard as the best networking system for Unix-only installations. AT&T and Sun agreed to merge — or at least integrate — NFS and RFS but have announced no results so far.

Meanwhile, the major Unix standards effort, Posix, is staying away from the whole issue of networking issues. Although X/Open, another Unix standards effort that supports Posix, is said to have

a networking subcommittee.

All the signs point to peaceful coexistence rather than amalgamation for NFS and RFS — at least for the moment. Lachman Associates, Inc.'s TCP/IP product for AT&T's Unix System V Release 3 currently supports NFS and soon will support RFS as well, according to product manager Michael Euler. And Macrominterlan supports both systems in its Ethernet TCP/IP board for Unix System V Release 3.

Since RFS and NFS address different user needs, Unix techies — who can do a little programming to interconnect the disparate systems — may be content without a standardized distributed file system. However, vendors that must connect to the non-Unix world or that do business with the U.S. government may find themselves being edged slowly toward OSI. NFS in particular, which currently links a broad range of computers, may eventually give way to OSI's FTAM as the multivendor file system of choice.

Horowitz is a Computerworld senior editor writing on networking.

Netview gains system options

NEW YORK — With its recently announced Netview Release 2, IBM has significantly increased the range of its devices that can interact with the network management system.

Netview Release 2 provides remote monitoring and downloading of configuration data to several IBM devices announced two weeks ago, including the 3737 Remote Channel-to-Channel Unit and 3174 cluster controllers equipped with the newly announced 3174 Configuration Support A.

Release 2 enhances hardware monitor support so that a 9370 remote Netview host can collect network-related error data from a System/36 IBM LAN Manager, VTAM Support of the IBM 9370 Token-Ring Subsystem Controller, the 3174 VM/SP 9370 Token-Ring Alert Support and the IBM PC 9370 Emulation LAN Management Program. This enhances a 9370 target Netview system's ability to act as a local management system for a Token Ring network, IBM said.

Fourteen more vendors will be making initial statements relative to Netview and Netview/PC, IBM's Personal Computer-based interface between networking systems and Netview, IBM said. Among the expected Netview supporters are telecommunications equipment vendors Doela Networks, Inc., Racal-Milgo, Racal-Vadic, Avanti Communications Corp. and Paradyme Corp.

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NEW PRODUCTS

Local-area network software

Communications Research Group has introduced PC Blast II, connectivity software said to allow users to exchange any data among any computers running Blast or PC Blast II.

Features include automatic dialing and automatic data transmission, script files for presetting frequently used functions and repetitive dialing and automatic interfacing with remote systems.

According to the vendor, systems that can be linked with PC Blast II are those

from IBM, Andahl Corp., Digital Equipment Corp., Wang Laboratories, Inc., Prime Computer, Inc., Data General Corp. and Hewlett-Packard Co. as well as multuser Unix systems and Microsoft Corp. MS-DOS-based systems.

PC Blast II costs \$250. Blast II costs from \$395 to \$1,295.

Communications Research Group, 3rd Floor, 3615 Corporate Blvd., Baton Rouge, La. 70808.

Customer-premise equipment

An entry-level data matrix switch has

been announced by Telenex Corp.

The Autonex Mini-Matrix Switch is said to support up to 64 data terminal equipment ports and 48 data communications equipment ports in a nonblocking configuration. Up to 16 circuits can be routed through the switch to monitoring and testing facilities.

The Mini-Matrix Switch is said to provide each circuit with an independent path. Circuits are bandwidth independent, operation is menu driven, and most monochrome ASCII terminals can be used as the system-control console.

The Autonex Mini-Matrix Switch is priced from \$11,000, for a 16 by 16 configuration.

Telenex, 13000 Midatlantic Drive, Mt. Laurel, N.J. 08054

Links

Version 3.1 of Jnet, featuring the bi-synchronous Network Job Entry protocols used by IBM's Remote Spooling Communications Subsystem Version 2 and Job Entry Subsystems, has been announced by Joiner Associates, Inc.

Jnet is said to permit file transfer, electronic mail exchange and interactive communication between Digital Equipment Corp. VAX/VMS systems and IBM mainframes on a peer-to-peer basis. In addition to supporting the Network Job Entry protocols, it also supports VM-to-VM bi-synchronous protocol.

Jnet runs under VMS Version 4.2 and later and is priced by VAX models. License fees range from \$23,500 to \$47,000.

Joiner Associates, P.O. Box 5445, 3800 Regent St., Madison, Wis. 53705.

Electronic mail

The Complete Answering Machine (CAM), a voice-messaging coprocessor board for Microsoft Corp. MS-DOS-based personal computers, has been announced by The Complete PC, Inc.

The board is said to operate concurrently with PC applications and provide personal voice mail, advanced message handling and basic telephone answering machine functions. CAM digitizes the caller's voice and stores it on the computer's hard disk. Features include multiple voice mailboxes, the ability to provide callers with mailboxes and message forwarding.

CAM is priced at \$349.

The Complete PC, 521 Cottonwood Drive, Milpitas, Calif. 95035.

Modems/Multiplexers

Micom Systems, Inc. has introduced a V.22 bisynchronous three-speed dial-up modem called the M3124EH type M2.

The modem is said to use custom-signal processing and surface-mount technology to reduce its size to a 3.9- by 3.9- by 0.65-in. space for integration into personal computers, terminals, printers and test equipment.

The modem features the Hayes Microcomputer Products, Inc. AT autodialing command set and error correction.

The M3124EH type M2 modem costs \$499.

An evaluation kit for testing the modem's functions costs \$699.

Micom, P.O. Box 8100, 4100 Los Angeles Ave., San Valley, Calif. 93062.

Cabling

The Model 35 adapter cable from Teletype Technology, Inc., designed for interfacing various RS-232C devices, is said to provide a switching matrix in place of the patchbox usually found in an RS-232C breakout box.

The adapter uses standard DIP switches to alter the signal paths as required by the attached equipment. The Model 35 supports nine signals, including Frame Ground and Signal Ground. Transmit and Receive Data can be opened, passed or reversed. By closing the appropriate switches, Request to Send, Clear To Send, Data Set Ready and Carrier Detect can be connected in any manner desired.

The Model 35 costs \$38 each. Teletype Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

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The new Tele/386 can be customized to your need. Standard are a 1.2MB floppy disk drive, 8 expansion slots, serial and parallel ports, 2 Mbytes 32-bit 80 nanosecond RAM, and an enhanced AT-type keyboard.

Options include industry standard monochrome and enhanced color graphics displays, extended 2MB and 8MB RAM memory boards, and the leading operating systems, MS-DOS® 3.x, UNIX® V.3, and NetWare™ software. MS-OS/2™ support will be provided in early 1988.

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functions. Plus, access to the thousands of popular, powerful applications programs written in MS-DOS.

The new TeleNIX/386 is the perfect high-performance solution for single-user applications such as desktop publishing, engineering and scientific applications, as well as software and artificial intelligence development.

It's also the perfect solution for multi-user systems where personal computer workstations aren't a requirement. As your needs grow, the new TeleNIX/386 provides the power to expand to meet the demand. To make expansion even smoother, don't forget there's an entire line of TeleVideo ASCII, ANSI and pc-compatible terminals.

The TeleNIX/386 comes with an enhanced AT-style keyboard, a sharp high-resolution text and graphics monochrome display, 14-inch green non-glare screen, and an easy-to-adjust tilt swivel base.

Introducing the TeleSTAR/386* Engineering Workstation.

The new TeleSTAR/386 is the first "open system" engineering workstation with 386 power plus high resolution for just \$10,995.

The "open system" architecture gives you the flexibility, adaptability and portability you need in a workstation.

The TeleSTAR/386 may be the most affordable 386-based engineering workstation you can buy, but it's packed with features. In addition to the concurrent

UNIX V.3 and MS-DOS operation all TeleVideo 386s share, the TeleSTAR/386 features MIT's X Window™ standard user interface system for single screen interfacing, plus GKS software for standard graphics applications. To help you share the power, there's a built-in Ethernet™ interface with TCP/IP and NFS software supporting NFS™ from Sun Microsystems.

The features go on and on. A high-resolution 1280 x 1024 pixel display. A 17-inch color monitor (19-inch monochrome monitor is optional). A 1,256 simultaneous color display from a 16 million color palette. A three-button optical mouse. And 4Mbytes of 32-bit RAM memory that's expandable to 16 Mbytes.

Introducing the PM/386 network file server.

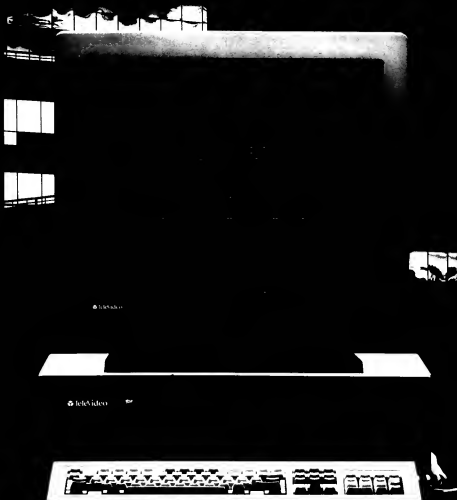
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SYSTEMS & PERIPHERALS

HARD TALK



Jeffrey Beeler

CLX's quiet revolution

Since Tandem Computers, Inc. in Cupertino, Calif., introduced its low-end CLX system in April, much has been spoken and written about the processor's price: No other machine that supports Tandem's Guardian operating system even comes close to matching the inexpensiveness of a minimum CLX configuration, which costs \$57,000.

Attention has also been lavished on the system's reported high reliability, low maintenance overhead and small footprint.

But still largely untold is the story about how Tandem exploited chip development technology and departed from its traditional approach toward processor design to make the system's purported user benefits possible.

With the advent of the CLX, Tandem has become the first vendor to use silicon compilation to develop a chip set implemented in CMOS technology, according to Bill Stenzel, development manager for Tandem's

Continued on page 48

A safe harbor for port data

Crescent system expected to pre-clear, track goods in New Orleans

BY STANLEY GIBSON
IN STAFF

NEW ORLEANS — The Crescent City is looking to a computer system of the same name to help turn the tide for its waning economy. The municipality hopes the Crescent computerized clearing system will speed the flow of cargo and pull more shipping into the Port of New Orleans.

Expected to be fully on-line in a matter of weeks, Crescent is in the final stages of testing. The goal for the \$2.5 million system is to assure comprehensive accounting for cargo and allow 80% of it to be cleared through the U.S. Customs Service 72 hours before a ship arrives.

With red tape cut, trucks can meet the cargo as it unloads without standing idle awaiting

the time-consuming completion of paperwork, according to Jerrol Larnue, director of MIS for the Port of New Orleans.

Combined effort

The result of a 2½-year development effort, Crescent consists of an IBM System/38 Model 600 computer running application software created by Cyber Data Systems, Inc., a division of McDonnell Douglas Information Systems Group, Inc.

Although a native of New Orleans, MIS director Larnue came on board at the port only in April 1986, well after the Crescent project was launched. The 41-year-old MIS executive had been a McDonnell Douglas employee and was previously in charge of a System/38 shop at Ingram Corp., a firm based here and active in the oil, gas and ship-

ping businesses.

Drawn into the vortex of the oil industry depression, the Port of New Orleans' slugging tonnage was recently eclipsed by that of the Port of New York. Now No. 2 in the nation, New Orleans had long been the No. 1 port in total tonnage.

The city feels competition from all other shipping centers on the Gulf of Mexico and as far away as Baltimore. To attract shipping, it must offer fast handling and low fees.

In the past, a number of shipping management stages stood ready to delay vessels that came to call. Arriving ships must apply for a berth in advance of arrival. Because ships vary widely in size and shape, they require different berths to accommodate them.

Matching ships with berths is

Continued on page 46

Masstor ups data storage

SANTA CLARA, Calif. — Seeking to address greater storage requirements, Masstor Systems Corp. has introduced a hardware-based data-compression option for its 556-byte M860 mass-storage device.

The company, which markets a mainframe storage system based on video-recording technology, claimed that users typically can achieve a 2:1 compression ratio. It said that the ratio would be higher in certain applications. Mike Beardsmore, Masstor's senior vice-president of marketing and systems development, also claimed that the hardware option has no impact on CPU's performance, while software compression can increase CPU overhead by 30%. Masstor said the compression option makes it easier to use the M860 to make backup copies of large quantities of data stored on direct-access storage devices.

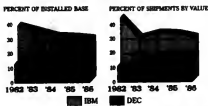
Prices for the option are \$160,000 for the controller and \$25,000 per module attached to the controller.

Inside

- Celenty upgrades Image-maker/1 for use in graphics image-rendering applications. Page 49
- Honeywell Bull designs high-resolution asynchronous display terminal. Page 49

Data View

IBM vs DEC
Competing in the global medium-scale systems market



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP. CHART: SHAN ALZAM

Workstation line extended

BY ROSEMARY HAMILTON
IN STAFF

HUNTSVILLE, Ala. — After a slow start in the workstation market, Intergraph Corp. last week launched an assault with the rollout of 12 models ranging in price from \$22,000 to \$72,000.

Intergraph introduced the 32C line of workstations a year

Continued on page 48

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Safe harbor

FROM PAGE 45

a complicated task that Crescent will perform using a data base complete with the berthing characteristics of all vessels that call on the port.

On the Mississippi River, the berthing problem is made more difficult because of the changeable nature of the fanned waterway. Anyone who has read Mark Twain may remember that the Mississippi constantly churns up and deposits silt in different places along its bottom. Consequently the depth at a given berth in a port can change in a short time. A previously safe berth can suddenly become too shallow.

In order to stay one step ahead of the river, port person-

nel sound its depth every day. Measurements from the soundings will be entered on terminals into the Crescent system so that a ship can be matched with a safe berth. In managing this information, Larnue says the System/38's widely noted data base characteristics are excellent.

Conduit for brokers

Another key job of Crescent will be to serve as a conduit for shipping brokers to send manifests to the Customs Service.

Just as the Customs Service charges duties on cargo based on the manifest, the port charges wharfage fees. But sometimes shippers have been tempted in late two sets of manifests, declaring less cargo to the port than they declared to the Customs Service.

Severe penalties for smuggling caused shippers to take chances in reporting their vessels' contents to the U.S. government. But the port, as a division of state government, does

not have the extensive enforcement abilities of the federal government and thus does not command the same respect in the eyes of would-be violators, according to Larnue.

With Crescent relaying the shipping information it receives to the Customs Service, one manifest will be handled by both, eliminating the possibility that two sets of books could be kept, Larnue says.

As a result, Louisiana will be able to take in what otherwise might be lost in wharfage fees. Manifests will be sent as Electronic Data Interchange (EDI) transmissions to the U.S. Customs Service in Franconia, Va. over a 9.6K bit/sec. dedicated line.

Creating seamless EDI communications presented problems for Crescent's developers and is the major reason the system's start-up is almost one year behind its original target date, according to Larnue.

Although PC users may employ almost any off-the-shelf communications software, the Port hands out free 5¼-in. floppy disks containing communications software, which Larnue praises as particularly user friendly. The package is licensed by the port from Local Data, Inc. in Torrance, Calif.

Crescent will use McDonnell Douglas' Tymnet value-added network to enable a steamship agent to access the system by making a local telephone call anywhere in the world. Tymnet charges will be billed to Crescent, which in turn will bill the customer.

Boon for honest shippers

However, there is no legal requirement that shippers submit manifests to the Customs Service through Crescent, and some are already dealing with the Customs Service electronically in their own or through value-added networks, according to a customs spokesman. Using Crescent, however, would provide honest shippers the convenience of submitting a manifest only once.

"Crescent has passed their test with us," the customs spokesman says, explaining that all those who wish to send shipping information electronically, such as shippers, brokers and ports, must be certified. The Customs Service's own computerized system, called the Automated Commercial System, became operational in 1984.

Another of Crescent's functions will be to keep track of the wide variety of wharfage fees assigned to different cargoes.

For example, steel is charged at different rates depending on its alloy composition and fees for mechanical equipment, from farm machinery to computers, vary greatly. All the different rates will be entered into the System/38's data base, according to Larnue.

In order for maximum benefits to be drawn from the system, its use must become second nature to members of the New Orleans shipping community.

"The success of Crescent depends on whether or not people use it," Larnue says. With this in

mind, the port has launched a publicity campaign complete with a colorful poster and logo.

But raising awareness is only the first step. Crescent's designers recognize that user friendliness is perhaps a larger issue as shippers, accustomed over the years to paper forms, switch to computer terminals equipped with modems.

Client input

In designing the system, the port formed user committees, consisting of such clients as steamship owners and truckers, to discuss their needs. Putting their recommendations into practice, systems engineers created simple commands, intended for use on any personal computer or ASCII terminal, according to Larnue.

Although PC users may employ almost any off-the-shelf communications software, the Port hands out free 5¼-in. floppy disks containing communications software, which Larnue praises as particularly user friendly. The package is licensed by the port from Local Data, Inc. in Torrance, Calif.

Crescent will use McDonnell Douglas' Tymnet value-added network to enable a steamship agent to access the system by making a local telephone call anywhere in the world. Tymnet charges will be billed to Crescent, which in turn will bill the customer.

'Maxed out'

Crescent is geared to support a maximum of 200 remote users and 50 local users, with the ability to handle 50 users at any given time. "We took our needs and doubled them," Larnue says, describing the process of determining the machine's capacity requirements.

He says the only potential bottleneck is that the System/38 has only 12 communications ports and Crescent may require more. "We are now maxed out," Larnue says, adding that he is exploring ways to expand communications capacity.

But the next few months will be filled with anticipation for Larnue, the port staff and Cyber Data personnel as the system is made fully operational. With a successful debut, Crescent's influence over the port and New Orleans' economy will certainly grow.

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CLX

CONTINUED FROM PAGE 15

in end systems.

The CLX's announcement also marks Tandem's first use of what it calls "cross-coupled CPL's," a design technique in which two duplicate microprocessors reside on the same processor board. One of the CPL's processes the system's transactions while the other monitors them and checks for errors, Stenzel said.

Cross-coupling contrasts sharply with Tandem's existing hardware designs, in which each CPU chip requires its own board and comparator circuits are used to compare the output from processors performing the same task.

How Tandem designed and developed the CLX's CMOS chip set may be the most interesting facet of the announcement, according to Bear, Stearns & Co. analyst Jonathan Frank.

The significance of the CLX's cross-coupled CPL's "went right over everybody's head," Frank said.

One explanation for why the technology has drawn so little attention is that Tandem itself deliberately downplayed the matter. "We considered telling the technology side of the CLX story when we announced the product but decided against it," said Terry Retford, manager of the vendor's processor systems marketing. "We were concerned that if we released too many details about the system, the picture might have gotten too confusing."

ten too confusing."

To an even greater degree than Tandem's previous entry-level system, the Nimrod EXT, the CLX is intended to extend the company's existing network out to the remote offices of major corporations. To succeed in such a setting, where environmentally controlled machine rooms are nonexistent and the users are computing novices, a system has to be compact, reliable and easy to service.

So in designing the CLX, Tandem embraced cross-coupled CPL's. With the CLX, by contrast, Tandem has devised a patented and highly complex process by which errors are detected by the CPL's themselves rather than by intermediary circuits. In essence, the company's cross-coupling technique

allows two CPL's on the same processor board to check each other's output for accuracy, Stenzel said.

Lowest cost

By making comparator circuitry unnecessary, the design approach minimizes the CLX's parts count, which, in turn, translates into improved hardware reliability and decreased floor-space requirements, he added.

Since the key principles of the CLX's CMOS chip set had been defined, Tandem used silicon compilation to implement them. Silicon compilation basically does for integrated-circuit developers what automated code generators do for programmers. The process automates many routine, mechanical phases of chip design and frees engineers to concentrate on high-level concerns, according to Dennis Sabo, vice-president of sales and marketing at Silicon Compiler Systems, Inc.

Using a compilation tool from Sabo's Los Gatos, Calif.-based firm, Tandem has tested the implementation of the CLX's chip set. Had the firm not automated much of the processor's design, "we would probably have taken a bit of about a year," Stenzel said.

By shaving time from the CLX's development effort, Tandem lowered its production costs.

Retford declined to say how much the CLX would have cost if it had been created through conventional circuit-design techniques. He also declined to answer questions about the extent to which the system's early market entry is likely to boost Tandem's revenue.

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Workstation

CONTINUED FROM PAGE 45

ago but shipped them in limited quantities through March, a company spokesman said. The microprocessors are based on the Fairchild Semiconductor Corp. Clipper microprocessor, which is said to process data at 5 million instructions per second.

The limited shipments resulted from Intergraph's own development snags as well as the limited availability of the Clipper chip in 1986 and early this year, Intergraph said.

Shipment dates for the new systems, also based on the Clipper chip, range from July to September.

The models make up Intergraph's 200 and 300 series aimed at the mid-range and high end of the workstation market. There are three configurations within the 200 and 300 series. They are available as single- or dual-screen models. Each system is based on a three-processor configuration, with the Clipper chip acting as the CPU. Each system also comes with a separate proprietary graphics processor and a separate I/O processor, which is based on the Intel Corp. 80186 or 80286 microprocessor, depending on the configuration. At the low end is the Interpro 220, a single-screen workstation that includes the Clipper, the Intergraph Graphics Standard processor, which is said to be able to display 4,096 colors simultaneously, and the 80186-based I/O processor.

The Interpro 220 starts at \$29,000, Intergraph said.

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NEW PRODUCTS

Processors

Logic Process Corp. has added the NLC Pro Tower 32 software-compatible **Model 21** to its Mpulse line of Unix-based systems.

The Mpulse Model 21 comes with a 16-MHz Motorola, Inc. 68020 main processor, a 28-msec 40M-byte hard disk, a 4M-byte main memory, eight RS-232 ports, a 4M-byte cassette tape backup and a proprietary disk cache I/O processor powered by twin 12-MHz 68000s.

The Model 21 also comes standard with the vendor's demand-paged virtual memory implementation of AT&T's Unix System V. It features dynamically configurable disks, on-line bad block replacements, on-line device configuration, streaming tape operation and bidirectional modem support.

The Mpulse Model 21 costs \$8,995. Logic Process, 10355 Brockwood Road, Dallas, Texas 75238.

Celerity has introduced a version of its C1230 superminicomputer said to combine reduced instruction set computer architecture with numeric processing capabilities for use in graphics image rendering applications.

The **Imagemaker/1** offers single and double precision floating-point operations as well as trigonometric and scaling operations. It accepts input from the workstation using an Ethernet local-area network and provides network facilities such as remote login, file transfer and remote command execution.

The standard configuration includes 12M bytes of system memory, one 337M-byte Winchester drive, a 5-in.-cartridge tape drive, Unix software for two users, an Ethernet interface kit and a C language compiler. It costs \$81,950.

Celerity, 9692 Via Excelencia, San Diego, Calif. 92126.

CAD/CAM/CAE

A raster-scan graphics workstation said to be plug compatible with IBM mainframes and designed to meet the Nacsim 5100A Tempest standards has been introduced by Spectragraphics Corp.

The **DS 1082CXT** is said to allow users to run existing IBM 5080-based application software, such as Cadam, Inc.'s Cadam and Catia, without modification. The system provides 1,024- by 1,024-pixel resolution in 256 colors with local three-dimensional transforms and area fill.

A basic system includes the graphics controller, a 19-in. monitor, a keyboard and 512K bytes of display list memory. A loaded system supports peripherals such as a tablet and puck, programmable function keys and dials and a communications adapter.

The basic version costs \$29,900. Spectragraphics, 9125 Rebo Road, San Diego, Calif. 92121.

Data storage

The **14000** series of half-height 5¼-in. Winchester disk drives featuring data transfer rates of 10M bit/sec. has been introduced by **Cast**, a wholly owned subsidiary of Century Data Systems, Inc.

The drives are available in formatted

capacities of 114M, 140M and 170M bytes. They were designed for use with controllers based on either the enhanced small device interface or the small computer systems interface standard and operate at average access times of 25 msec, the vendor said.

Each drive incorporates four disks and is said to operate at a track density of 1,440 tracks/in. and 19,405 bits/in. using 2,7-ran/line limited encoding.

The 114M-byte 14404 costs \$1,500; the 140M-byte 14405 costs \$1,700; the 170M-byte 14406 costs \$2,000.

Century Data Systems, P.O. Box 3056, Anaheim, Calif. 92803.

Terminals

A high-resolution asynchronous display terminal designed for use with its large and small computers has been announced by **Honeywell Bull, Inc.**

The **Honeywell Bull Display Station Model 5 (HDS 5)** features a 14-in. monochrome tilt-and-swivel monitor with green or amber phosphor. It offers 800- by 350-dot resolution and can display either 80 or 132 char./line, as well as double-height and double-width characters. Support for fast jump and up to five screen partitions is provided.

The HDS 5 terminal costs \$995. Honeywell Bull, 300 Concord Road, Billerica, Mass. 01821.

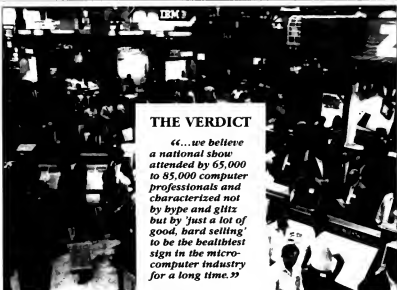
Printers/Plotters

A 37 page/min. continuous fan-fold non-impact page printer for IBM plug-compatible applications has been announced by **Mitelpo Business Products, Inc.**

The **Series 37**, an ion-deposition technology printer, provides letter-quality printout at 300 by 300 dot/in. resolution. It features eight 128-char on-line sets that are either host or operator selectable, the vendor said.

The Series 37 with a Dataproducts Corp. parallel interface and the vendor's advanced function controller costs \$26,500.

Mitelpo Business Products, 1770 Wall Whitman Road, Melville, N.Y. 11747.



THE VERDICT

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David Hill
Editor
MICRO MARKETWORLD
11/24/86

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ment, and will be promoted worldwide to attract even more than the 7,000 foreign buyers who came in 1986. It's all shaping up now to make COMDEX/Fall '87 the most valuable event possible for manufacturers and resellers alike.

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Every month Eastern Airlines has five days to assign 12,000 pilots and flight attendants to thousands of different routes. But flight crews aren't automatically assigned a monthly work schedule. They bid on routes, and are assigned on the basis of seniority.

For years this process was handled manually. Eastern had to deliver route selections to its employees, wait for employees to fill out their bids and return them to a specific destination, put route preferences in order of seniority, and make

assignments and return approved schedules to employees.

The whole process was inefficient. And Eastern wanted an automated solution that would relieve this aggravation.

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"Eastern had 12,000 employees traveling throughout the Western Hemisphere and no easy way to reach them."

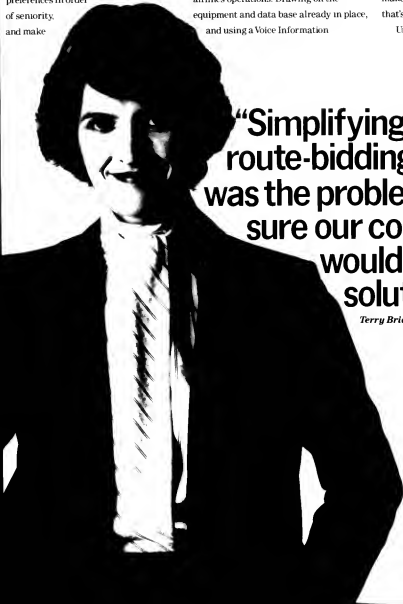
They were already using Unisys computers to handle other aspects of airlines operations. Drawing on the equipment and data base already in place, and using a Voice Information

Processing System in an innovative way, they found the solution. Eastern and Terry developed the first automated crew bidding system in the world.

"Now, flight crews just pick up a touchtone phone and they're into the system. Going step-by-step through the interactive system, they can enter their bids, receive their bid awards and even swap flight assignments.

"We all really worked together—crews, members, management and Unisys—to make everybody's life easier. And, well, that's the power of."

Unisys and airlines. The power of.



"Simplifying Eastern's route-bidding system was the problem. We were sure our computers would be the solution."

Terry Bridges, Account Executive, Unisys

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EXECUTIVE REPORT

ROUNDTABLE

Those maintenance blues

Users of code-restructuring engines compare notes

The specter of tangled spaghetti code consuming system resources and maintenance budgets has sent a shiver down more than one MIS manager's spine. After all, in many shops, 20% of the code is responsible for 80% of the maintenance headaches.

In an attempt to resolve this problem, four tools — Superstructure from Group Operations, Inc., Structured Retrofit from Peat Marwick Main & Co., Recoder from Language Technology, Inc. and IBM's Cobol/SF — are marketed as restructuring engines — products that take difficult-to-read old code and convert it into more readable structured code. To find out if these tools are viewed favorably by those who use them, *Computerworld* recently hosted a roundtable meeting of managers knowledgeable about the products.

The roundtable attendees, although clearly impressed with the products, saw them as first-generation tools — tools that are evolving as vendors incorporate user requests for more flexible products that can adapt to a shop's individual needs.

The participants did not question the power of the engines, and all agreed that restructuring products created functionally equivalent code. What concerned them most were the tasks of determining which code needed to be restructured and, once the code was restructured, determining whether it was worth the cost, since modifications were still needed.

The roundtable was moderated by Nicholas Zvegintov, editor of "Software Maintenance News."

What makes these tools worthy of your interest?

Scott: If you are an 80% maintenance shop, and you figure your maintenance costs, they will be millions and millions of dollars.



Jon Payne
General Mills, Inc.



Paul Tinnirello
A. M. Best Co.



Tony Scott
Indiana Bell



Nicholas Zvegintov
"Software Maintenance News"

Also, there's about 17 billion lines of Cobol code out there. What are we going to do with it? We've got to go to look at anything that's going to come close to addressing that problem.

Is it a problem in your shop specifically?

Scott: Oh, yes. We spend millions of dollars every year not increasing the direct benefit to the business — not bringing some new development that's going to bring in new revenue to the business — just enhancing the software that's already generating some revenue.

Payne: It's exciting that there is another alternative available now to the traditional way we do systems development. It used to

be if the code was old, nobody even wanted to address it, and so we ditched it and went out and bought a package, or we tried to attempt to write it in-house, and it ended up costing us a lot of money to do it one way or another.

Now we have another alternative. We can sit down and say, "Can I save the best parts of what is here and maybe pull in the functionality that seems to be missing? Maybe I can renovate, put some new tires on it, and get a few more years of life out of it." Possibly I can postpone the decision to bring in something new for another year or another five years vs. saying, "Well, 50% of it's bad, so let's throw out the whole 100%, and

we'll start all over again from scratch."

Then how do you assess the success — potential or actual — of these particular tools?

Scott: We've looked at what I consider all four of the [Cobol] restructuring products. We tried to measure the benefits of making a change in today's corporate environment and then tried to compare it with making a change in the restructuring environment to see if there was a direct benefit.

We also tried to see exactly how much time is involved to take code, after it gets restructured, and put it back into production without making any type of change. I call this "nonproductive time" because it's very costly. You have to get an understanding, if you've got millions of lines of code that you're going to put through a restructuring tool of what it's going to cost you to put all of those lines back into production.

Tony, you've actually done parallel tests, right?

Scott: Basically, we set up tests where the maintenance change was first effected or changed in the nonrestructured version. And the same programmer who was familiar with the code would make the change in both the nonrestructured version and the restructured version. Then we brought in a new person who was not familiar with the code, and he went through the same process with first the nonrestructured code and then the restructured code.

Each programmer made several changes. The problem we found was that the changes we implemented were so minor that we didn't get enough data to justify the purchase of a product.

The changes were too easy to see any difference? So they didn't really present a real challenge

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MAX FACTOR DID.

Max Factor's international operation has that vibrant glow about it. And Cullinet's Manufacturing System (CMS) software helped make it that way. The largest producer of its kind in Europe, Max Factor currently offers over 1,300 different cosmetics and fragrance items. Unit totals exceed 55 million annually. The key to success in the industry? Max Factor people believe it is keeping inventories low while at the same time maintaining a high service level on customer orders. CMS does just that. It's an advanced MRP/II system that gives the 800 manufacturing and distribution personnel at the huge U.K. plant the capability to plan, control and react to real-world changes in a variety of manufacturing environments. Inventory and service objectives have become easy to attain. And the software has paid for itself in very defined terms over a short time. In the next five years, they plan to save five times their original investment. Obviously, CMS allows the best possible use of resources so that Max Factor, Ltd. just keeps looking better every day.



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As America's second largest manufacturer of hosiery for men and women, Kayser-Roth understands that support is a key component of any software solution. That's why they selected the Cullinet Manufacturing System (CMS) featuring the Implementation Workbench for Manufacturing. This package of expert-based application and sophisticated implementation tools will enable Kayser-Roth to achieve an overall integration of information among departments. Their data exchange plans extend from PC to mainframe to user tools - between headquarters, multi-site plants and warehouses. Kayser-Roth's corporate managers use the Implementation Workbench for Manufacturing to enhance their implementation efficiencies, project planning and scheduling. Access to project status data helps meet target projections. CMS also provides superior on-line user documentation, interactive training and data conversion instruments, giving Kayser-Roth a most valuable tool for achieving its goals.



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Digital Equipment uses Cullinet software to distribute Digital products. That's one of the highest compliments they could pay. Cullinet's Distribution Management System has allowed Digital to achieve real warehousing flexibility, because the same software can be utilized at multiple sites and still be tailored to the needs of each individual one. The ability of the system to be networked nationwide has provided Digital with the interconnectivity they were looking for. It has resulted in an optimum level of performance - one that has dramatically increased inventory turnaround. And Digital feels that Cullinet's vendor performance has been equally impressive. The distribution personnel say their success is shared with Cullinet - people who have become more like colleagues than vendors. Five Distribution Management products are available to companies like Digital: Order Management, Warehouse Management, Distribution Resource Planning, Distribution Center Management and Sales Forecasting. Digital knows how important these products are. Their clients believe that "Digital has it now," and Cullinet helps keep it that way.

WORLD CLASS AND DISTRIBUTION. CULLINET.



LHTEC DID.



TECH FORM DID.



3X3 ARCHITECTURE

The Light Helicopter Turbine Engine Company (LHTEC) did not exist as an entity until the U.S. Army instituted its T800 Full-Scale Engineering Development Program. T800 is the designated propulsion system for the LHX program to ultimately upgrade the Army's entire fleet of light helicopters. To accomplish that task within the Army's production competition strategy, the Garrett Turbine Engine Company of Allied Signal and the Allison Gas Turbine Division of General Motors joined resources for the Full-Scale Development (FSD) portion of the program. Even though these companies will become competitors during the production phase, FSD required they function as one, with a management process featuring fully integrated software and a state-of-the-art performance measurement control system. Cullinet's Manufacturing System (CMS) with EASYTRAK enabled easy linkage of files from cost, scheduling and technology standpoints. This project was accomplished across an 1,800-mile distance, with both partners having equal access to vital information simultaneously. And Cullinet managed to deliver up to 70% more savings in day-to-day operational costs than any competitive vendor LHTEC considered.

Tech Form Industries makes tubular exhaust components for automotive production. And when they needed a repetitive manufacturing system coupled with an automated release package, an exhaustive search led them to Cullinet's Repetitive Manufacturing System. This on-line, closed-loop, MRP II System software runs on VAX as well as other departmental platforms. Because of its exceptional automation of workflow and documentation, it is helping TFI meet the growing needs of original equipment automotive manufacturers around the world. Timely information turnaround has given Tech Form better tracking of investment balances. They can interface financial reporting with shop-floor data reporting systems. And because it's a stand-alone, in-house system - not a tie-in with an outside mainframe - it lets TFI realize the tremendous savings inherent in departmental, one-site computing. TFI products contribute to the performance of scores of domestic and foreign cars and trucks. And Cullinet's Repetitive Manufacturing System is helping to keep the company on the road to greater profitability.

An investment in a truly integrated information management system is one of the best investments a company can make. And the investment in Cullinet is easier to justify than ever, because only Cullinet's 3x3 architecture offers an "industrial strength" database, comprehensive tools and more than a dozen fourth-generation business applications. Those include Project Management, Distribution Management and Manufacturing for both IBM and DEC VAX systems. Finance and Human Resource applications provide additional breadth. All of them are engineered to work together for total corporate computing solutions. System portability and referential integrity are assured - with connectivity between PCs and departmental computers, and SQL compatibility across a three-tiered platform. Get the complete Cullinet technology story in our new IDMS/87 brochure. Call toll-free 1-800-551-4555. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

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Blues

FROM PAGE 51

far the programmer?

Scott: That's exactly. Another thing we found was that the definition of "structure" is also misleading. There are many different types of structure. A programmer might look at some code and say, "OK, this code is very nested. It has a lot of GOTOs," so therefore it could be an unstructured code. What we found was that although the code may be nested and although it may have GOTOs, it did flow from the top down to the bottom. Therefore, the programmer who was familiar with it understood that flow. It started at the top and went to the bottom and when it was done it had done all its processing.

When he put a restructuring technique there it took the stuff and moved it all around. Now he had all these PERFORMs and he had his five fingers in the code, and he was saying, "OK, now I'm here and here." Next he gets down to this PERFORM, and there's one line that says, "Move A to B," and he says, "I don't want this."

Everyone is nadding. So there are many cases that turn out like that?

Tinnirelli: It depends on what you define as structured. If you're going to subscribe to the theory that structured code has no GOTOs, then certainly you can look at that as a case.

But there are plenty of programs that are what I call loosely structured, which use forward GOTO or even GOTO logs, that are written very readably, very understandably and very cleanly. The elimination of those GOTOs would require more overhead in terms of PERFORMs, more complications in terms of the number of lines of code and paragraphs, and, therefore, could probably change what might have been something easy to read into something more complicated.

What does he ask the question "What do we really mean by structured?"

Foram: We had to try a couple of techniques to really find a dialect or standard that made sense to everybody because we had a lot of those same problems. All of those tools are so powerful that if you just take the details, you'll get something that you wouldn't think could have ever come from the same shop.

Even if you're used to seeing large paragraphs, there are some shops in which people might be comfortable seeing small programs that might be unique to the architecture of this machine or something.

In our case people are very comfortable with large paragraphs, and all of a sudden [after restructuring], they got some-

thing back that had a lot of one- and two-liners in it, and they said, "I don't understand this." They may not have made an attempt to really look at it and analyze it. They just looked at it and said, "This is different and it looks harder than what I've seen before."

So it's important that a successful restructuring tool be one you can tune toward your local dialect. Do you think the vendors started off with the notion that there was one structure and then learned from the market this realistic truth — that there are many dialects of structure and that what the market is looking for is a tool that will translate the code into something that people are used to reading?

Scott: That's true. Just look at the code that Retrolit put out two years ago and the code that they're putting out today. It is totally different. And it is very valuable to be able to select the parameters that Jon talked about to increase the paragraph size or decrease the paragraph size and NOT conditions and specify how you want your IF-THEN-ELSE structured. I don't think the vendors realized that two years ago I think they're starting to evolve those products.

Tinnirelli: I think it was a major technological achievement to get a tool to restructure. So in the first evolution of the tool, I would suspect getting it to do the restructuring was the primary objective. Now that that's understood, the next evolution is to be able to tune to the environment you're used to and I think that's where the vendors are heading. I certainly think that's important.

Has anybody got an up-beat restructuring story? Where there cases where something came up and you or somebody said, "Oh! Now I understand what that piece of code did."

All: No. Tinnirelli: I can't evaluate that, because after spending a lot of time understanding one program we had that was restructured, it came back, but I have to say that it took me a while to re-read the code in restructured format, only because I understood it in unstructured format.

Would that be a problem, then, with people bringing in restructuring tools?

Tinnirelli: I suspect it would be a problem only for those people who are accustomed to understanding it in unstructured mode. I see that as a short-term problem.

If those systems are
Continued on page 55

Assault on tangled code: Four tools share the field

Four products dominate the Cobol restructuring market, and all four vendors of the tools attack restructuring differently. Service and prices also vary considerably. The following information, compiled by Garth Parikh, a Chicago-based consultant who specializes in software maintenance and programmer productivity, provides a basis for further investigation.

Cabal/SF is a Cobol restructuring tool introduced by IBM in 1985. "It's product transforms the spaghetti logic of an unstructured Cobol program into a structured Cobol program containing top-down, hierarchical, single-entry/single-exit code with no GOTOs or ALTER program statements."

Cabal/SF is one of the first software maintenance products to use artificial intelligence. According to the vendor, the strength of the product lies in its AI techniques, which involve the use of production, or IF-THEN, rules.

Production rules are drawn from the definition of the Cobol programming language and from structured programming principles. However, a problem with the tool is that the input programs must be in Cobol II — IBM's version of Cobol 85 — which requires the conversion of non-Cobol II programs into Cobol II programs to take advantage of the product. Cabal/SF is based on the functional restructuring method of Linger, Mills and Watt, who are also the developers of this particular tool. The product will restructure any application in Cobol II.

The tool runs on all IBM mainframes and costs \$12,500 per month or \$125,000 for a one-time charge. The cost includes a 2-day training workshop. Telephone assistance is available from IBM through a toll-free product support telephone line. Neither the number of customers nor the number of installations for the product is available.

Recorder is a restructuring product developed by Eric Buch, founder of Language Technology, Inc. in Salem, Mass.

Recorder creates a structured program that is top-down, hierarchical and tree-structured. It uses single-entry/single-exit blocks of code, which the program addresses in turn. The program will not skip backward or forward using GOTOs or conditional GOTOs in IF statements.

The tool provides several options to help customize restructuring programs. For example it can control the nesting of IF statements to any level and then simply find conditionals by controlling AND, OR and NOTs within IF statements. In effect,

this creates shorter sentences out of long ones. According to Language Technology, this reduces the amount of time spent analyzing the program.

The product uses the graph theory — a formal language theory — to produce structured programs. However, the knowledge of graph theory is not necessary to work with the restructured programs. Recorder will restructure any application written in Cobol; Cobol 85 is supported.

Language Technology offers two-day training, which is included in the product's purchase price. Advanced training — in software re-engineering — is available at an additional cost of \$1,500 per student. There is also a toll-free telephone number for further support. Language Technology claims 39 customers and 45 installations for Recorder.

The restructuring tool will run in IBM MVS and VM environments and on IBM and compatible mainframes. It costs \$150,000 for a perpetual license. Additional information on other hardware supported on a service basis and other pricing terms are available from the vendor.

Superstructure from Group Operations, Inc., based in Washington, D.C., is the least expensive among the four principal restructuring products. Superstructure does its job in its way.

After restructuring, the original flow of the program is retained in the structured program, so programmers familiar with the old program may find the restructured code friendly.

The program is organized into a series of modules executed from a mainline routine by a hierarchy of PERFORM statements.

The interparagraph GOTOs are eliminated, but GOTOs that loop within a paragraph remain. In addition, fall-throughs are eliminated.

During the restructuring process, Superstructure will also convert dead code to comments, remove ALTER statements and altered GOTOs and correct PERFORM range violations as well.

Developed by Henry W. Morgan, now vice-president of Group Operations, Superstructure uses the Ashcroft-Manna

technique for converting unstructured programs into structured ones.

Superstructure will work with any Cobol restructuring application written in Cobol. Cabol 85 will be supported in the fourth quarter of 1987.

Group Operations reports 127 customers and 151 installations for its restructuring product. The tool runs on IBM mainframes as well as the Unisys Corp. 1100.

Superstructure costs from \$28,000 to \$45,000, depending on the operating system. One-day training is included, as is a hotline number for further user support.

Structured Refrait represents the pioneering work of J. Chris Miller, his company, The Catalyst Corp., was the first to offer Cobol restructuring on a service basis in 1980. Catalyst was later acquired by Post Marwick Main & Co. in Chicago in 1983, and Structured Refrait became a product in 1985. The tool met the evaluation criteria and has been selected as a restructuring tool for the General Services Administration's Programmer's Workshop.

The product's restructuring process removes all ALTER statements, PERFORM-THRU and fall-through logic, eliminates dead code, restricts GOTOs to local loops, restructures the program into a hierarchical structure and isolates and consolidates all I/Os.

The tool is designed to produce functionally structured programs based primarily on the standard control structures originally proposed by Böhm-Jacopini. The push-and-fork model is used to balance the language. The product will restructure any application written in Cobol; Cobol 85 will be supported in the fourth quarter of this year.

Structured Refrait runs in IBM MVS/VM environments on IBM mainframes, Unisys Corp. A series machines; Honeywell Bull, Inc. DPS 8 and GCOS; Wang Laboratories, Inc. VS; and will soon run on the Unisys 1100 series.

Post Marwick has 36 customers and 60 installations for Structured Refrait. The product costs \$89,000 for a perpetual license in MVS/VM and \$4,900 per month on a lease basis. Two days of on-site training are standard, and additional advanced training, consisting of a 15-student class, is available for a fee of \$2,000 per day. A software support hot line is also available.

Blues

CONTINUED FROM PAGE 54

parameter-driven systems in that they can produce different dialects, would it be useful to have a model in which a restructurer could be a probe or a microscope — that is, a tool for which a programmer would take a program and not restructure according to standards so much as use it to look at a program in different forms and see if he could bring it into a focus that he recognized?

Payne: That's the kind of process we take now with the worst kind of programs. You can't just pop a program into one of these tools and then have perfectly good code

YOU can't just pop a program into one of these tools and then have perfectly good code coming out of the back end."

JON PAYNE
GENERAL MILLS, INC.

coming out of the back end.

It seems to be kind of an iterative process, [the programmers] will clean up some of the major defects before they'll do anything with it at all. They'll run the code through and say, "Well, that's a little bit better; now I understand a little bit more about the structure." Then they'll change it some more, run it again, and eventually, they may end up with several versions of it at the end, depending on how they treat the parameters, until they get it to the point where they say, "Aha, this starts to look like what I've seen and repeated in other systems before." But they don't seem to get there in one jump — it has to be a repetitive process.

But is what you're describing a se-

quence in which [programmers] would use different processes? They would restructure it and then make manual changes — change the names of variables — things that restructuring won't do?

Payne: Not so much variables; maybe they'll look at some of the major defects that were there, like recursive PERFORMs or whatever, and say, "Let's get rid of this particular one right here. It should take care of a whole bunch of these other problems that I seem to be having with the way this logic is laid out. We'll run it through again, and let's see what comes out." In fact, they start to get a feel for it — they know what the tool's going to do after they've run through it a couple of times. The first time they do it they really don't have a clue as to what's going to come out the other end. Then they say, "Oh, OK, I pull this, and this happens here; I pull that, and I get a result I don't want, so I know not to mess with that."

Tinnirello: A restructuring tool doesn't prevent the programmer from making some changes beyond what [the tool] has done — certainly either to change the variable names or to fit a set of standards the firm has. I don't know how everyone views the use of a tool: some may just run [the restructurer] and accept it as it stands. But there may be a lot of people who use it as a way to get through the code. Once the code is in "some kind of better state," they can improve it as a result of either variable changes or standards and take it from there.

In some cases, that may take a couple of passes, depending on how the person views it. As a matter of fact, it may turn out that, after restructuring, a programmer may perceive that the logic can be cleaned up or reorganized in such a way that maybe the programmer can actually change it and make the program smaller, because now he understands what has actually taken place.

Are restructuring tools making incremental changes in the way programmers work, perhaps

The participants



Tony Scott is an analyst/programmer manager at Indianapolis-based Indiana Bell. He is responsible for improving the quality and productivity of Indiana Bell's 200 application programmers. Indiana Bell ran trials and parallel tests of all of the principal restructuring products.



Paul Tinnirello is assistant vice-president of data services programming. He is responsible for the development of financial application systems at A. M. Best Co., an Oldwick, N.J.-based insurance information publisher. Tinnirello has experience with programs restructured with Language Technology, Inc.'s Recorder.

Jon Payne is user support manager at Minneapolis-based General Mills, Inc. He is responsible for maintenance and systems support for all General Mills sales systems, which includes 19 regional offices and Minneapolis administrative sales systems. General Mills installed Pear Marwick Mann & Co.'s Structura Retrofit and Pathvu products in January. The tools currently run on a multiput environment.

Nicholas Zveigintov is editor of "Software Maintenance News." Zveigintov has more than 18 years of experience in MIS. For the past eight years, he has specialized in software maintenance. As a management trainer, he has worked for IBM, Wang Laboratories, Inc., the U.S. Army and Mobil Oil Corp. Zveigintov is a director of the Software Maintenance Association.



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making their work a little easier? I remember when nobody would let programmers clean up their environment. Maintenance was so hassled that there was never time to change something to make it a little better.

Payne: Programmers are in a bit better shape now before they start attacking changes and enhancements.

Some of the vendors used to recommend not restructuring after every change made, on the grounds that people would forget how to write structured code, and they would just write the code anyhow and think, "Well, they restructure this evening anyway."

Tinnirello: It becomes a dependency.

In terms of cleaning up programs, I find that analogous to seeing a piece of wallpaper in your room and deciding, "I'll just cut this little piece out." You wind up starting to scrape a little bit more and all of a sudden, all the wallpaper, the drapes, the carpeting — everything is yanked out.

I don't think we've ever prevented programmers from cleaning up programs. I think we've had some difficulty in managing that function. And there are times when you can go in to make subtle adjustments.

But the difficulty arises when programmers draw the line between how far they should go or what they perceive to be the changes. Sometimes they wind up making a change and saying, "Well, now I've eliminated all the 77s and made them all 1s. Now I want to start doing some pretty printing, some organizing," and boom, boom, boom — a day turns into a week, a week turns into a month. You might as well rewrite.

So managing that task is an issue. I've encouraged people to try to clean up when they can but to recognize the bounds of how to do that.

Scott: It's the problem of adding structured code to an unstructured system. We teach structured techniques to all of our new people, then we put them out into an unstructured environment. If they go into that code and try to add structured techniques — restructured coding techniques — to nonstructured code, they're going to find problems.

Payne: Or they'll find trucks.

Scott: Yes. And what we find is they get started, and they say, "Well, if I take this and rewrite it, then my structured change will work with this paragraph together because it's structured," and soon, it's just what Paul said: You're done; you've rewritten the whole thing — all because you had this small little change, and you didn't know how to add the GOTOs.

There's an interesting contrast here between the notion of, "These are tools that encourage you to do an infinite number of small, very desirable changes," and what I've heard some vendors say that they think works best among their customers, which is suggesting that you get a SWAT team — a bunch of people authorized to move through the total system, changing everything and getting it all straightened out.

Scott: We've never brought in a SWAT team. Basically, we just put it out there

CLEANING UP programs is analogous to seeing a piece of wallpaper and deciding, "I'll just cut this little piece out." You start to scrape a little bit more, and all of a sudden, all the wallpaper, the drapes, the carpeting — everything is yanked out.

PAUL TINNIRELLO
A.M. BEST CO.

and make it available.

Payne: I think the idea of having, for lack of a better word, an evangelist who has to see this product in at the pure level is important. You've got to have somebody down there that's as excited about it

as the supervisors and managers are. The managers have a vision of what they want, but you've got to have somebody down there that's enthusiastic about it to get the people fired up.

There is a healthy skepticism about

these products. "Will this thing really restructure this code exactly like it did before? Or will it cause more problems later on down the line because there are going to be other things wrong with it that I don't understand right now?"

Scott: We have done a lot of contracting with the different vendors on a service-by-service basis. What we've found was that we had 12 million or 14 million lines of code, and we didn't know what needed to be restructured, what was the most important thing to the business.

We had to ask ourselves, "Is the code a problem today? Are we making changes to it? Is it going down a lot? Is it unstructured? Is it structured and going down a lot?" We had a lot of issues that we had to figure out. It turned into the get-the-best-

"We changed over 8,000 programs last year alone. Who in the world could keep track of all that?"

Robert Wooten, A.M. Best Co.
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bang-for-your-buck theory.

We figured that 80% of our problems were probably contained in 20% of our code. We had to get a handle on that before we could go on with the restructuring problem.

In the last two years, three of the vendors have moved to offer a front-end evaluator aimed at answering what you're saying — to go in and tell you which lines of your 14 million to change.

Payne: We wanted to find those black holes that all the resources seemed to go into. We were curious when we were doing our evaluation about where the holes would show up and if [the tools] would agree with our internalized definition of what was good and what was bad. We were surprised that it came out as close as it did. The badches came out bad, the goodies came out good, and the ones in the middle, we said, "Yeah, that sounds rational and reasonable to us."

THE problem was, 'Dollar for dollar, is it going to be better for the company to restructure it as to not restructure?'

TONY SCOTT
INDIANABELL

We had the same problem Tony has, in that we're trying to get the maximum benefit out of this thing right away, because it's kind of a new idea or a new concept.

What about the block holes? None of you come up with any glowing, upbeat endorsements, but here there been cases where everybody involved agreed that a system was so awful that almost any change would be welcomed by almost anybody?

Payne: We've seen that on individual programs. We may be fortunate that not everything in a system is bad. People seem to be able to differentiate that these are actually good programs. The system may have some structural flaws, but they say, "I know that one is the one I spend all my time on," and if you restructure that one, almost all universally agree that it is an improvement. Perhaps it's still not the way they would do it if they were writing it from scratch, but it's better.

It appears that the cost of buying or licensing one of these products, plus the expense of the computer

time to run them, is not going to be a driving issue when compared with what shops are already spending on programming. The question is whether you can show that it works off. This is where the challenge is.

Scott: That's exactly where the challenge is. Based on the experience, we don't have any prob-

lems saying that it will produce functionally equivalent code. The problem was, "Dollar for dollar, is it going to be better for the company to restructure it as to not restructure?" We found that it took a lot of time to bring the code back to our standards and a lack of commitment on our part to spend the extra dollars to say, "Is there a savings?"

You can run parallel tests, but

it's very expensive. You can take a program that somebody knows and change it and try to say, "OK, now which one's better?" That's one test.

The other test is, "I've got this code that I don't understand, and I'm constantly making changes to it. How much time is that going to take vs. the code that's structured, making changes to it?" Hopefully, by be-

ing structured as time goes on there's going to be more savings. But it's very costly, and I don't know of anybody who's committed to doing that. So therefore, you've got the problem of testimonials.

But you don't really have a testimonial yet, do you, because it's a long-term effect you're looking for.



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and the products have only been in the market three or four years, which is an awfully short time in the life of a software system.

Payne: And the systems didn't get that way in two years or three years, and we're not going to re-engineer all the defects in the world in a couple of years with the first wave of the tools.

that are coming out

Scott: Plus, if there's not a commitment to do that testimonial from some type of corporation, how are we ever going to know? You're not going to maintain both setups. The reason we're bringing in productivity tools is to increase productivity, not to maintain two systems. So you've got the problem that you can't win either way.

Tonnello: Isn't this kind of similar to the idea of "Will standards themselves improve the bottom line?" How long has it taken for us to determine whether standards have really made a difference? I would dare say it was a while before we really understood that implementing standards does affect the overall bottom line. But it didn't happen with the first round of standards

that we implemented on our programs. I think that's important to keep in mind.

If we all believe tools and technology are offering something we need if we are to keep up with the growth in complexity of software, in what direction should the vendors be going, technically and pro-

emotionally, to make this real for your companies?

Timmerlo: It's not that we doubt these things work, but it's hard for us to say right now: "I swear by it up and down." Anybody would be foolish to go blindly in like that. The doubts really are interpreted as concerns. But we are concerned and rightly so.

In terms of the approach for the future, there are a lot of variables. I'm concerned about something you mentioned earlier—the dependency factor that programmers will fall prey to. There is some issue that programmers might perhaps become very dependent, so much so that they actually lose some of the skills that they may have achieved, but that remains to be seen.

That may be good or bad; it depends on who you ask. For people who believe in the theory that we do not need programmers and that we just need tools — with people to man the tools — that falls right in line. If we

IT'S hard for us to say right now: 'I swear by it up and down.' Anybody would be foolish to go blindly in like that."

PAUL TINNIRELLO
A. M. BEST CO.

believe that no matter what the technology, we need smart people to be able to implement it, that's another path.

Which of those camps would you say you're in, Paul?

Tinazzella I'm probably in the latter. I really believe that we need people who are knowledgeable enough to use the tools and understand them.

Jon, in what direction should the vendors and the practitioners be moving to make this a reality?

Payne: Probably the ability to run on multiple hardware seems to be an important criteria. If it doesn't run on your hardware, it's a little tough to use.

That's a concern with your shop, right?

Tinnirello: I think another concern is what is happening on the development side. There's all the talk about developing systems out of specification languages — where the maintenance people don't maintain Cobol anymore. Are we talking about a tool that's only going to be around for 10 years, 15 years, 20 years? My hunch tells me that I'm going to retire before the last Cobol language is out.

But maybe the tools should be

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enhanced or upgraded to allow us to do some more work with these system-generating technologies.

Scott: I think the direction of the vendors kind of jumps back into the standards issue — it seems like I am the standards person, which I'm not.

I think the direction we need to take to get a handle on that many lines of Cobol code is one in

which we incorporate it in something that we can manage. And what I mean by that is using the structuring tools and newer tools that are coming into the market to bring the data names into a specific name. I want Zip Code to be called "Zip Code." I want a definition that Zip Code is going to be "ZIPdash C O D E" and that's the only way I want to see it. I don't want to see it any

other way.

Once we have those specifics, I want them incorporated into a data dictionary so that it can be maintained in one place. And I think the restructuring tools will help us in getting a certain structure to the code and incorporate that with this data administration function to be able to take these tools and do away with the Cobol. Put it into some upper

level language, because it's all going to be in a certain type of format.

All my Reads are going to be in "paragraph such-and-such," all my Writes are going to be in "paragraph such-and-such," generated up to a higher level language with an active dictionary that I can maintain. They could incorporate them into the source-code generators.

If you are talking future, it could very possibly go that way, and the source-code generator would then, in turn, generate the code, and that would hopefully take care of some of the efficiency problems that we have with these restructuring products.

Timinello: Except, where do you now start applying the concept of maintainability — at the higher level language or at the lower level language, which is Cobol?

Scott: At the higher level language.

Timinello: So you're suggesting that we move to a translation environment and get out of Cobol in terms of maintaining and writing and moving now into another language entirely, which can be generated into Cobol as the undercoat, so to speak?

Scott: Yes.

This is the dream.

Scott: This is the dream, the ideal environment. He said "future," so I went crazy. In talking to the vendors, I think they are looking

"I want a definition that Zip Code is going to be 'Z-I-P-dash-C-O-D-E,' and that's the only way I want to see it. I don't want to see it any other way."

TONY SCOTT
GENERAL MILLS, INC.

at this and are moving in that direction.

Timinello: One question I think we haven't talked about is whether we believe restructuring is the only tool that we need to consider in terms of the maintenance environment, and that raises the question of how many tools we actually need and whether vendors will start integrating these tools together to start making them, as a package, more usable.

If I were a plumber and someone asked me what the best tool was that I use on my job, and there are 25 plumbing tools, I may only choose one because that's all I can afford or I only know how to use one, and I wish I had one of my super pocket knives, Swiss Army knives, that's got everything on it. We certainly see the concept of integration in other areas, certainly in development when it comes to the fourth-generation language-type systems that have become more integrated.

We may see tools becoming more integrated so that they have multiple benefits, and we have to consider that as a possible alternative for the future.

Scott: I think that's excellent.

Payne: We should stop calling our plumber. *

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IN DEPTH

The dangers of dabbling in expert systems

At \$700 per rule, knowledge-based systems demand a thorough feasibility study

BY LOUIS FRIED

Knowledge-based systems tools and technology are at a stage comparable to that of database management systems in the mid-1960s. They are poorly understood, few people know how to use them appropriately, and few people can determine what their benefits will be to the user organization.

In a recent survey conducted by SRI International, U.S. corporations either developing or using expert system applications identified the leading benefits of knowledge-based applications. Among others, they named improved decisions by nonexperts, more consistent decision making in less time, training improvements and operational cost savings. However, none of the respondents was able to attribute an exact amount of financial benefit to the application. Clearly, adequate feasibility studies need to be performed prior to attempting to use this technology.

The need for feasibility studies is especially important in view of the cost of building an application at this stage of the technology's maturity.

High average cost

The SRI survey indicates the average cost of application development — excluding the costs of hardware, software tools and the time of experts who contribute to the knowledge base — is \$700 per rule or rule-equivalent.

Fried is assistant executive director of the Information Industries Division of SRI International in Menlo Park, Calif.



The average cost of developing an application is \$260,000. Applications development costs range from small experimental systems in which the knowledge engineering investment was about \$5,000 to more than \$1.5 million for large implementations.

It must be emphasized that the above costs are only for knowledge engineering and the development of the end-user interface to the application. The cost of developing and implementing the application includes much more than the time of the knowledge engineers.

In fact, successful implementation of anything other than a small, locally used knowledge-based system application may require the organization to invest in developing a complete infrastructure for the development and maintenance of the system.

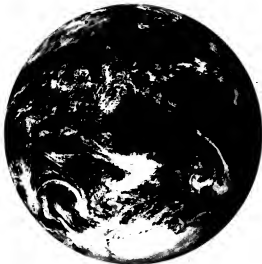
For application development, this infrastructure includes training, hiring or contracting knowledge engineers; acquiring specialized workstations for development use; acquiring development tools; and identifying appropriate experts to contribute their knowledge to the knowl-

edge base. For ongoing operation of the system, delivery hardware for end users, delivery software, continuing knowledge engineering to keep the knowledge base current and the continual contribution of refined or new rules from experts may be necessary.

All of this argues convincingly for ensuring the proper approach through a feasibility study in advance of such investment and for beginning the use of this technology in a manner that incurs the least risk.

On first introduction to knowledge-based technology,

- Users have not identified benefits up front
- You may need a whole new infrastructure
- A feat best left to the experts



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Look before you implement: Performing a feasibility study

Articles and papers published during the last 15 years document the steps in performing a feasibility study for computer applications. Typically, these sources assume users' previous experience with computers and often assume the existence of computer resources, systems analysts, programmers and so forth.

Perhaps the approach necessary for knowledge-based system applications is more closely aligned with the time when computer technology was in its infancy and formal methodologies for feasibility studies were not so common.

Even if a particular application has been selected in advance, a feasibility study for that application should be performed before undertaking a development project. The approach outlined below is for users with no prior experience with knowledge-based system development and who do not know precisely which applications would be most desirable to implement.

Familiarization. Potential users of knowledge-based system applications and representatives of the organization's MIS department (if appropriate) gather for a one- to two-day seminar in which they are taught the capabilities and limitations of these systems and how they compare with conventional DP applications.

The seminar participants are coached in the desirable attributes for potential applications and in the approach to be used in the feasibility study. They then nominate a group of potential applications for study and identify experts who might contribute knowledge to the applications' development. Quite often, a questionnaire containing prompts may be used to identify potential applications.

Selection. The knowledge engineers performing the feasibility study briefly review all candidate applications and select

the three to five that appear most promising in terms of apparent technical feasibility and value to the organization. Ten critical factors (see main story) are used informally for this review. The remainder of the feasibility study then concentrates on these three to five applications.

Detailed study. Knowledge engineers conduct a series of interviews with those people identified as experts in the domains of the candidate applications to determine the application's technical fea-

sibility and to identify potential benefits to the organization that might result from the application's implementation.

In addition, managers and potential users within the functional areas that would be affected by the application are interviewed to determine the organization's willingness to adopt the technology, place values on the possible benefits and understand the future application's working environment. The knowledge engineer particularly attends to identifying the real needs of the user organization as compared with the (possibly) theoretical requirements stated earlier in the identification of the candidate application.

Study report. The feasibility study report includes the following contents:

- A detailed description of each of the can-

didate applications.

- An evaluation of each application's technical feasibility.

- An evaluation of the level of expertise available.

- Identification of the resulting benefits.

- Identification of the risks in each application.

- Ranking of the most promising applications among the candidates.

- Specification of the infrastructure, hardware and software required to support the selected application.

- Specification of a preliminary project plan for development of the application.

- Estimation of the development cost.

- Analysis of cost/benefit, constraints, risks and potential delay factors.

LOUIS FRIED

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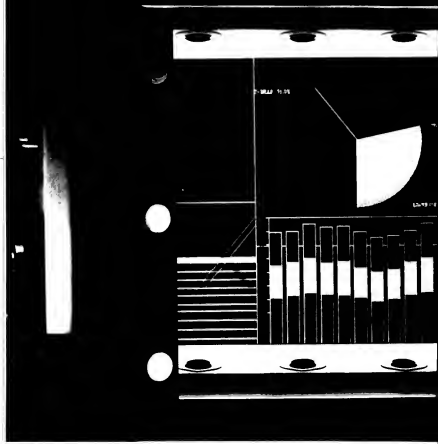
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Expert systems

CONTINUED FROM PAGE 66

concept in mind. Since knowledge-based systems work on cases, any change of data or the knowledge base occurring during the case session will confound the process and provide incorrect results. Therefore, the environment cannot be so volatile that either the case data or the rules would change during the decision-making process. Either change would require that the case be presented to the system again as a new problem. Under most circumstances, this constraint does not present a problem. However, in real-time applications it may be a critical factor in determining application feasibility.

The application domain is bound, and the boundaries are known. Current knowledge-based systems are not creative—that is, they do not invent knowledge beyond the knowledge instilled. This means their reasoning process fails at the boundary of their knowledge. A small child knows that if a glass of milk is knocked over, the milk will spill out of the glass, run across the table and pour into the lap of the child's mother.

This simple commonsense knowledge can be available to a knowledge-based system only if each step of the action and the consequences of each step exist in, or can be derived from, the knowledge base. If we inform the system only that the milk will spill from the glass when it is knocked over, then this is the boundary of the sys-

tem's ability. It will not be able to determine that the milk will run across the table and pour into the lap of the mother.

A common problem in feasibility studies for knowledge-based system applications is the difficulty of defining the boundary of knowledge to be instilled in the system. In one proposed application, the problem was to determine whether certain chemicals in combination would result in carcinogenic products. While the list of known combinations is not infinite, it might as well be, from the standpoint of trying to capture and maintain a knowledge base of all known combinations.

Where the boundaries are fuzzy or not known, it may be feasible to address an arbitrarily bound set of knowledge. However, when the problem can neither be arbi-

trarily bound nor clearly defined a reliable application is rarely feasible.

Solutions reached by the system may be proven as valid. The issue here is simply that if you cannot tell whether the solutions reached by the system are correct, then you cannot rely on the system for any decisions. From the perspective of the feasibility study, it is necessary to determine whether objective means exist by which the conclusions the system reaches may be tested for accuracy, consistency and validity.

One method for obtaining such proof is to amass a set of test cases and conclusions based on prior experience. This set should include some in which conclusions were invalid. Even these cases may not test all the parameters of the system, however, there will be some objective evidence that the system's reasoning follows the reasoning of human experts.

An automobile manufacturer developed a knowledge-based system application for diagnosing engine problems. Using test cases, the system was iteratively

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IF THE decision-making environment is so volatile that the knowledge base must be continually revised during development, the application's development may never be complete.

tested until it met 100% reliability in the laboratory. The manufacturer's team realized that lab tests only approximate the real world, so the system was tested among a small group of dealers.

Iterative testing within this group led to a field-tested reliability of close to 90% in diagnosing engine problems. At this level, the system can provide a significant improvement in dealers' service levels. Clearly, in this case, objective proof of system reliability and accuracy was possible. Where possible, it would also be valuable to compare the degree of improvement in decision-making achieved by the system with methods used before the system's implementation.

Knowledgeable, articulate and cooperative experts exist and have the time to contribute their knowledge to the application. A good test of a potential expert's knowledge would be a world-class reputation in the domain. However, such a level is rarely available. Within an organization, therefore, it is necessary to rely on the evidence of performance, success in problem solving and reputation.

The expert must be articulate, but this ideal is double-edged. The knowledge engineer must be able to understand the expert. While the expert is describing the problem domain and providing examples of cases and their solutions, the knowledge engineer should be able to evaluate whether the expert expresses concepts and ideas clearly and in a language understandable to a nonexpert.

In a feasibility study for a proposed application in biochemistry, for example, the expert was enthusiastic and vocal about the applications. She was articulate within the knowledge domain and could communicate well with her research associates. However, she could not make herself understood to the knowledge engineer, and no other engineer was available

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who possessed any greater level of understanding. Under these circumstances, the application would not have been feasible, although training a fellow biochemist in the techniques of knowledge engineering might have been possible, which would thereby have developed a successful application.

Finally, the expert must be cooperative. Experts who are

otherwise qualified may claim to have too little time available to participate in the development project. Others will cite heavy travel schedules. Still other experts are daunted by the technology or concerned about job security after the system becomes operative.

Knowledge engineers must take care not to destroy the potential cooperative attitude of

the experts. To do this, the knowledge engineer should describe the capabilities and limitations of knowledge-based systems to the experts.

In addition, the experts should know that most knowledge-based systems are capable of addressing the 80% of the problem domain that is relatively routine. This permits the expert to deal more intensively with the

remaining 20% of problems that require his creativity. Even as the knowledge base becomes more refined, the expert may add additional problems that will become routine to the system.

In one case, while studying the feasibility of an engineering design problem, it was determined that the company employed only three experts in the domain. These three jointly de-

cided not to cooperate. However, the company recognized the system's value and felt the application should be developed if at all possible.

The company finally retained two recently retired experts to act as consultants. While this solved the immediate problem, it is a less-than-optimal solution, since knowledge-based system applications generally require continuing expert input.

The size of the knowledge base is practical. Several considerations enter into determining the estimated size of the knowledge base and setting the constraints within which the application must operate.

A key consideration is the ultimate expected environment for the system's delivery. If the application may be operated from a centralized point in an organization, then installing the application on a large workstation such as a LISP-based machine used for application development may be feasible. With

THE expert must be cooperative. Some may claim to have too little time available. Others cite heavy travel schedules.

the high price of such workstations, however, using them for substantial distribution of the application to many users would be prohibitive.

Alternatively, delivering the application through terminals connected to a central computer or via personal computers may be considered. Given current price/performance ratios of minicomputers or mainframes as compared with workstations and PCs and the limitations of most terminals' presentation formats, the central computer approach is not usually a cost-effective option.

PCs may be a useful delivery mechanism, providing the following applies:

- The knowledge base is not too large for available storage.
 - The knowledge base can be effectively partitioned.
 - Response time will be adequate, given the size and/or partitioning scheme used.
 - The amount of "reasoning" is not too extensive or complex.
- In sum, the delivery environment and system's anticipated use present constraints on the size of the knowledge base that would be practical for the application. If the application would exceed these constraints, either it should not be developed or a different delivery system must be devised.

Estimating the size of the knowledge base is perhaps the most difficult aspect of the feasibility study. Current levels of

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How does New York know when data reaches San Francisco?

NDM notifies both data centers and provides complete statistics and audit trails.

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experience in knowledge engineering render this aspect of the study an art rather than a science. There is probably no substitute for prior application development experience to provide the skills necessary for this type of estimation. However, certain elements can aid in this process.

First, it is necessary to consider the tools that may be used to implement the system. Different tools present varying ranges of capability. The anticipated approach to system design may be rule-, frame- or taxonomy-based, or it may use other techniques. Each of these approaches to the architectural design of the knowledge base would influence the size of the knowledge base.

The tools that could be used to implement the application may or may not provide all three architectural options. Note especially that PC tools generally do not provide more than one of these options.

Second, it is necessary for the knowledge engineer to visualize, in some fashion, the architecture of the decision tree inherent in the application and attempt to identify the number of possible conditions and conclusions (or hypotheses) that the application might reach. This is done through the interview process by probing the expert for samples of the problems that the application will address.

Considering the prior experience necessary to estimate knowledge base size, it should be no surprise that many attempts by novices to develop applications have failed because of underestimating the size of the knowledge base and trying to develop the system in too limited an environment. Television programs demonstrating unusual stunts often announce, "This should not be attempted by inexperienced viewers." Perhaps a similar warning should be given to inexperienced knowledge engineers.

In addition to estimating the size of the knowledge base, it is also necessary to approximate the amount of memory occupied by the inference engine itself. In the version of the system delivered to the end user, the inference engine and the human-interface software, at least, will have to be resident in memory to meet reasonable performance requirements.

Major modifications to the software tools acquired for system development are not necessary. Most organizations intending to use knowledge-based systems are not in the software or artificial intelligence research business. As a result, they seek practical, workable, maintainable solutions. For this reason, unless the problem is highly unusual and offers a very high potential payoff, it is not advisable to attempt to develop the software tools or the inference engine to drive the use of the knowledge base.

For example, if the application is to be delivered as an on-board system, embedded in the controls for a mobile vehicle, specialized development will be necessary to implement the system. However, barring such circumstances, it is most practical to acquire an appropriate knowledge-based system shell from a commercial vendor that can provide ongoing support.

Obviously, once the buyer modifies the commercial software, the seller can no

longer warrant the performance of the system and may not be able to provide maintenance on the modified version. Therefore, if commercial software would require major modifications, users should consider the following alternatives:

- Select a different set of commercial tools that more closely match the requirements of the application.
- Determine if the value of the application and the ongoing maintenance cost would warrant development of the underlying software as well as the knowledge base.
- Restrict the application to fit the tool (assuming that enough benefit may be retained to justify the application).
- Delay the application's development until appropriate tools become commercially available.

The type of modifications referred to above are ones that would change the internal structure of the system or modify existing code. Many systems require that additions to the commercial code be developed to perform specific functions necessary to the application.

These additions can be made by existing from the commercially provided code at specific points in the processing and returning to it at an appropriate point after the subroutine is completed. This would not be considered a modification from the perspective of the software vendor.

It should also be noted that most expert system shells are currently designed to be used in a development mode by knowledge engineers. When the application is delivered to end users, the external interface of the system must be modified to match their tasks and abilities. Vendors would not consider such human interface changes to be software modifications. If the human interface relies on graphics presentation, moving the application to a different hardware environment for delivery may be very costly and time-consuming.

Benefits of implementing the application are definable and substantive. Interviewing the experts will lead to some definition of the benefits the application offers; however, it is usually necessary to interview the management of the operation in which the application will be used to obtain a more extensive definition.

The survey indicates the following list of benefits obtained from knowledge-based application implementation (in order of frequency of mention):

- Improved decision-making by novices.
- More consistent decision-making.
- Reduced design or decision-making time.
- Improved training.
- Operational cost savings.
- Better use of expert time.
- Improved products or service levels.
- A means of storing and maintaining knowledge.
- Rare or dispersed knowledge captured.
- Faster communication of rule changes.
- Improved customer support.
- Reduced staff.
- Increased sales.
- Reduced business risk.
- Improved research results.
- Proven feasibility of knowledge-based

Continued on page 72

How to choose your expert: Wait till the cows come home

While it is always a good idea to bring experts together when constructing an expert system, choosing the right breed of expert can be trickier than it seems.

One feasibility study concerned developing a system to advise farmers on the optimum feed mix for their dairy cows. Two experts in dairy farm production participated, and one of the two knowledge engineers performing the feasibility study had some farming experience, so it appeared that plenty of expertise was available and that communication would not pose a problem.

The experts described how the feed mix could be planned based on the various factors particular to these dairy cattle. The factors that would make up the knowledge base included the individual breeds of cattle, the climate conditions, the field crops that were available locally, the time since the cow had last calved, the consistency of the cow's manure, the age and weight of the cow, the supplementary feeds available and the amount of time the

cow spent grazing.

The size of the knowledge base appeared to be reasonable for implementing the system on personal computers so that it could be distributed to dairy farmers. The ultimate goal of the system was to recommend the appropriate mix and quantity for supplementary feed stocks to be fed each cow. This appeared to be a reasonable objective.

Just as the team was about to reach a conclusion and describe a procedure by which the results could be validated experimentally, one of the knowledge engineers raised a question.

"What if the cows don't like the taste of the supplementary food mix?"

After general laughter, the experts became serious. There was no way to predict whether the cows would eat the supplementary mix or eat it in the quantities determined necessary to improve milk production. In the final analysis, the expert was the cow.

The study went on to other potential applications, and the feed mix problem was dropped.

LOUIS FRIED

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Expert systems

CONTINUED FROM PAGE 71

systems use

In this last, intangible benefits outnumber tangible ones — at least in terms of being able to directly assign a dollar value. Despite the fact that this will probably be true for most early uses of the technology, when it is possible to estimate a dollar value, it should be done.

Optimum chance for success

After performing these 10 steps in the analysis, the most promising application should be selected from the candidates for continued investigation. If this is the organization's first experience with knowl-

IF THIS is the organization's first experience with knowledge-based systems, the application should be selected on the basis of its optimum chance of success rather than on potential benefits.

edge-based systems, the application should be selected on the basis of its optimum chance of success rather than on potential benefits. A failure in the organization's first attempt to use this new technology may cause it to avoid later attempts until competitive pressure forces it into implementation. By then, the organization may have to pay a high price to catch up with the competition.

Knowledge-based systems can be used

to solve business problems that are not amenable to conventional computer application solutions. Some of these problems may be surprising.

For example, a large food packaging company was facing a major problem. It operated a variety of packaging machine lines, packaging different food products at plants around the world.

In this field, a packaging engineer must consider three elements of the packaging

design issue to avoid production problems that may result in downtime for the production line and product spillage loss:

- The type of packaging machine in use: its design, speed and limitations.
- The type of packaging material from which packages will be made, including such issues as: Will it be sturdy enough to run through the machines? Is the material available for a reasonable price locally? Will the product to be packaged interact adversely with the packaging material?
- The shape of the package: Will it be top-heavy and topple during the automated packaging process? Can it be packed automatically into cases for shipment? Can appropriate labels be printed on the material or affixed to the package?

Packaging engineering is not a college major; it is learned by experience. The firm realized that of its five engineers, two were to retire in the current year, the rest would retire within five years — and there were no adequate replacements being trained. Clearly, the first step was to start training replacements for the engineers. However, the company felt it would be advantageous to capture as much expertise as possible from the engineers and use this to train others. Company executives proposed this knowledge be captured in a knowledge-based system.

During the feasibility study, it was discovered that the packaging engineers were required to analyze packaging problems at plants all over the world. A good deal of their time was spent traveling. It was felt that the system not only could be used for training but could eventually be adapted to diagnose production problems.

As development on the system proceeded, the knowledge engineers wondered why the production problems occurred. It was discovered that packages were designed by the marketing department, whose major interest was to attract consumers and occupy optimum market shelf space. This interest led in the department's designing packages of unusual shape that used unusual materials and often ignored the design constraints within which the packaging engineers were required to work. Furthermore, the marketing and the engineering departments were embroiled in a long, continuous feud and would not speak to each other.

The outcome was that the application was developed, used for training by the engineering staff, maintained and enhanced by the engineering staff but also delivered to the marketing department as a system to advise them on packaging design constraints. Marketing and engineering still do not talk to each other, but they use the system as an aid in designing packages, thereby reducing production problems with new package designs.

Knowledge-based system applications are feasible and can be of great strategic value to organizations in many industries. The feasibility study is intended to minimize risk and provide a level of assurance for the success of system implementation.

Prior experience in the development of knowledge-based systems can ensure competent preparation as well as aid in choosing the appropriate application. When the study is performed by professionals who are objective about the study's conclusions, an organization is assured that the appropriate technology will be applied to the problem, the selection of hardware and software will be satisfactory, and the risks incurred to the organization will be minimized. ■

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MANAGEMENT

TAKING CHARGE



David Ludlum

Education starts at home

If the country's undergraduate MIS programs are falling short in trying to educate MIS professionals, as reported in *Computerworld* the past two weeks, those who feel some responsibility might find consolation in indications that the problem is not an isolated one.

A lack of effective education also seems to be a pressing issue within MIS organizations themselves, to judge from a recap of a Chief Information Officer Round Table held this spring by the Boston chapter of the Society for Information Management. The roundtable, which was closed to reporters, was summed up at the chapter's luncheon meeting this month by its moderator, information systems consultant Dick Dooley of the Minneapolis-based Dooley Group.

Dooley seems an appropriate spokesman for the more subtle, long-range concerns of MIS managers.

Lanky and broad-shouldered with a shock of silver hair, he exhibits a detached outlook, a focus on the human side of the MIS profession and a laid-back speaking style coupled with a

Continued on page 76

In search of a strategic edge

Michael R. Vitale, an assistant professor at Harvard University's Business School, studies how companies can use information technology for competitive advantage. He says the nature of a firm's competitive environment should be a major factor in decisions to build systems. Vitale took time out from visiting several firms that have deployed information systems for competitive advantage to discuss his views with *Computerworld* senior editor David Ludlum.

How does one evaluate ideas for strategic information systems?

Traditional cost-benefit analysis is exactly that — it's cost vs. what tangible benefits are you going to get, and both sides of the equation are very hard to es-



Michael R. Vitale

timate with these strategic systems, because typically the system was designed to increase revenue, not cut costs, and that's hard to judge. I'm not saying you've got to abandon cost-benefit analysis or discounted cash flow, I believe in that sort of

thing, but I think there's got to be another layer — a more strategic analysis. That means looking at the system and asking how well it fits with your competitive environment and what it's going to do to the competitive situation in your industry.

What are the basic competitive situations companies would find themselves in?

The ones that just come out of classical economics are oligopoly, local monopoly and what I call the dynamic environment.

Are you looking at this in part because a lot of the current literature addresses the oligopoly situation? Knowningly or unknowingly, I think it does. It addresses it in

this way — that the systems are oriented toward gaining market share. You say to yourself, "Why wouldn't I want market share?" Well, in the dynamic environment, for example, it's equally as important to be able to get out of markets as it is to be able to get in. So you don't necessarily want market share all the time. You don't want market share if it destroys your local monopoly. You don't want market share if you have to change your company to the extent that it's going to remove or dissipate your competitive advantage.

Those analyses are almost all aimed at weakening the supplier, weakening the buyer, building a barrier to entry, eliminating substitute products and so forth. Very interesting if you're in a sort of oligopolistic, mature market where share has to come from someone else. If that's not your situation you're wasting

Continued on page 74

Consortium set to create expert shell

Insurance, utility firms join AI company to develop mainframe system

BY DAVID A. LUDLUM
CW STAFF

Four major corporations recently signed on with Artificial Intelligence Corp. to foot most of the development bill for an expert system shell that is intended to interface with data bases and applications on IBM mainframes.

The four sponsors are Liberty Mutual Insurance Co. in Boston, Southern California Edison Co. in Rosemead, Calif., Transamerica Insurance Co. in Los Angeles and an as-yet-named company. Artificial Intelligence officials said they expect to announce the name of the fourth company in three to four weeks.

The consortium of companies reportedly will sponsor development of an expert system shell — a tool for developing expert system applications — named KBMS. The companies are said to be chiefly interested in using the shell to develop expert system applications that can draw on a mainframe data base, reside within conventional applications and be accessed through teleprocessing monitors such as CICS.

The sponsoring firms, each of which has identified a pilot application for KBMS, are providing more than three-quarters of the financing for its development, according to Robert N. Goldman, president and chief execu-

tive of Artificial Intelligence. In return for the firms' investments, Artificial Intelligence reportedly has promised to provide the sponsors with a prototype about six months before the product is available commercially, along with up to six months of on-site consulting and credits toward the purchase of other products.

Gleaning input

In addition to the development money, Artificial Intelligence said it expects to gain input from the users while developing KBMS, including results of field tests and experience in supporting the shell. "It's one of those

things that I think works out very well for both of us," Goldman said. He added that he expects his firm to deliver KBMS to the sponsors late this year and to announce pricing, delivery dates and specifications for its commercial release in the fourth quarter. The actual release is scheduled for 1988.

Transamerica said it is aiming to use KBMS initially for screening applications for automobile insurance. The company now has a conventional application for the process that is difficult to maintain, said Don Prado, a Transamerica application development manager. KBMS should make maintenance easier, he said.

"You write something like that in Cobol and you're just writing literally hundreds of lines of

Continued on page 74

BOOK REVIEWS

Synnott on crafting the information weapon

The Information Weapon
By William R. Synnott

It is one of the great ironies of the MIS world that information managers are overwhelmed with information on how to manage information. On the subject of using information technology to gain a competitive advantage alone, one is bombarded with articles, books, seminars and luncheon speakers offering clues to boosting revenue, beating back the competition and earning a set of keys to the executive washroom.

It is therefore understandable that an MIS executive might approach a book like *The Information*

Weapon with some caution, even though it is authored by William R. Synnott, the well-known former senior vice-president of Bank of Boston Corp. who recently left that company to go into consulting.

Those who peer between the covers, however, might be relieved to see that Synnott has organized the book into four distinct sections, each addressing one of the forces that together constitute his concept of the information weapon, and that he outlines those forces and the territory he will cover in a concise, two-page preface.

The four forces, in the order

in which they are treated, are the following:

- The vision of information as a competitive force, reflected by the growing interest in the concept of a chief information officer.
- Merging the information systems strategy with the corporate strategy.
- A consistent, coordinated, responsive and "facilitating" technology architecture or infrastructure that ties together increasingly decentralized information resources.
- Continuous change that can be channeled into opportunities.

Synnott repeatedly states the

need to tie information systems initiatives to corporate strategy, and his book is anchored by his recommendations in that area.

He briefly describes six methodologies for integrating a strategic information plan with corporate strategy. Of these, Synnott chooses portfolio analysis to illustrate the integration of business and MIS plans because, he says, it focuses on the competitive marketplace rather than the budgeting process. He employs a collection of relatively simple four-element matrices derived from strategic planning models.

Next Synnott attempts to

add to the analysis a means of identifying new business opportunities that can be spearheaded by MIS. To do so, he creates the "Information Weapon model," which identifies 12 alternative paths toward strategic thrusts that are rendered graphically with a three-dimensional, 3 by 2 by 2 box. The options encompass strategies based on product innovation, information services or enhanced productivity, each of which might be directed either internally or externally and position the company as either a leader or a follower.

But even with such a model, Synnott concedes that there is no "cookbook" solution to identifying strategic opportunities. "Nor can innovation and ideas be

Continued on page 76

Strategic edge

CONTINUED FROM PAGE 73

your time at best.

Could you cite an example of a company in a competitive situation where it would not be in its interest to pursue that sort of strategy?

Frontier Airlines is an example. Let's take them back to the time of deregulation. They were a relatively small, regional airline—Denver-based. They flew to a lot of weird places in the Rocky Mountains. They were profitable. They decided that as soon as they could, they would blast out of that niche.

Within a few years they had dramatically expanded the number of cities they served, and almost none of them were the cities that they used to serve. Instead of having those very thick, local routes they got a lot of long, thin routes, where people didn't know who they were. They didn't have any particular advantage and worse, they incited the competition. They got to the point where they were becoming an irritant to the big players, who clobbered them. But they gained market share. It didn't work out well for them. Another thing they might have done is intensely defend that local territory.

What about an example of a company in a dynamic situation?

The examples that people give are very

often in industries like semiconductors, where people get in, they're sort of very good at developing things, and then as soon as they become commodities they get out. It may not be worth chasing the curve down.

I think companies build up distinctive competencies at recognizing emerging markets and getting into them and then getting out when the time is right. Somebody made the joke once that said you can always tell when a market is nearing its peak, because General Electric would get out and RCA would get in.

Can you describe how companies in these two situations might respond to the need for a strategic system?

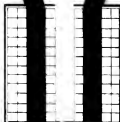
Another example of the dynamic environment is financial services. [Vice-president] Gene Bedell has done incredible stuff at First Boston Corp. I would claim he's getting strategic advantage, but he's not doing it by developing big systems. He's doing it by providing such an extraordinarily high level of support that the company's financial analysts are able to develop new, innovative products on a very smooth and timely basis.

Do you have an approach to strategic systems for a local monopoly situation?

The first step is to clearly understand what the source of the monopoly is. Certain hospitals have local monopolies that are based on them having the best doctors in the area. They've done things like put in information systems that allow those doctors to schedule operations very simply from a personal computer in their offices. Hospitals have started up central answering services for these doctors to solve that problem for them on a low-cost and effective basis. They've strengthened the relationship with the doctor. Their local monopoly is based on having a monopoly on the talent in the area. They've used systems to support that advantage.

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Expert shell

CONTINUED FROM PAGE 73

of code," Prado said. "And you're betting your business on that application." By joining the consortium, the firm can get the expert system shell more quickly and ahead of competitors, he added.

Transamerica may also use KBMS to develop programs for underwriting property and casualty policies and for processing claims, Prado said. Liberty Mutual said it plans to use KBMS first in underwriting personal insurance policies, speeding the identification of applications that require a detailed review by including an expert system application in a conventional program.

Southern California Edison said the firm intends to use KBMS to improve operations of power plants. The company plans to use expert systems developed with the shell to better match its supply of electricity with demand, according to Frederick J. Lanza, vice-president for marketing at Artificial Intelligence.

Goldman said KBMS will be able to employ four different reasoning methods in acting on a knowledge base of rules. It can use forward chaining, backward chaining, hypothetical reasoning and object-oriented programming. Most expert system shells rely on one of these, he said.

Another feature of the system will be an ability to use Artificial Intelligence's existing product, Intellect, to formulate English queries to mainframe data bases or to the rules of a KBMS knowledge base. Goldman said Intellect already uses a backward-chaining parser to process natural-language statements. It can be adapted to work with the IF-THEN rules of a knowledge base, he said.

KBMS reportedly will be developed in the C language and will be callable by a mainframe application. Although a precise schedule has not been set, Goldman said KBMS will support CICS, IBM's Time Sharing Option and Conversational Monitor System teleprocessing monitors and IBM's IMS, DB2 and SQL/DS data base management systems.

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Pinebrook Soup Company
Pinebrook, Illinois 60422
August 1, 1987
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1988	\$7,300,000	\$2,100,000
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1991	\$9,500,000	\$7,500,000

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Pistachio

Rich, creamy, and nutty. It's the perfect combination of textures and flavors.



Cashew

Rich, creamy, and nutty. It's the perfect combination of textures and flavors.

Education

FROM PAGE 73

knack for catchy expressions.

Among 15 concerns Dooley raised in the summation of the roundtable, a need for continuing education within MIS organizations emerged as a recurring theme. Among those concerns are the following:

- A lack of staff members serving as mentors or "corporate coaches" for junior MIS employees, due in part to widespread layoffs of middle managers who had imparted some of the wisdom of experience to younger colleagues.
- A "thinness" of technical ability among staff members.

- A lack of strategic technical ability in MIS executives who might assume the role of chief information officer.
- A need among MIS personnel for "learning to learn" in order to keep up with rapid changes in technology.

Dooley also addressed the issue of preparing for a career in school, focusing on the elementary and secondary level. Today's children may change careers dramatically during their working lives, but the educations they are receiving lack the breadth required to pursue such a course, he said.

Another point Dooley related is widely held throughout the management world and one that senior MIS managers must have heard repeatedly in one form or another, which suggests that many of

them have failed to absorb or implement it. The point is that what employees seek is "a piece of the rock" — the feeling that they are important to their organization.

Several other concerns suggest a need for more focused educational efforts specifically aimed at them. They include the following:

- Schedules almost everywhere are unrealistic, which, among other things, denies time for speculative thinking.
- There is a lack of "waste management," as evidenced by an excess of outdated systems and personnel.
- There is a need for organizational disaster planning to prepare for developments such as mergers and acquisitions.

Finally, two issues point to opportunities for MIS managers to move toward

the head of the pack through targeted study. One is the idea that corporate directors provide one role model for the chief information officer — that of a knowledgeable influencer rather than a doer. The other is the notion of adapting the portfolio management concept of the financial world to a growing array of issues that involve choice among a range of options.

Just as educators seem to need some guidance from MIS practitioners in turning out tomorrow's professionals, perhaps educators could help MIS organizations with their efforts to get their own houses in order.

Ludlum is *Computerworld's* senior editor, management.

Synnott

FROM PAGE 73

pre-engineered," he writes. "Most of the time they are spontaneous and unplanned. Ideas are often the product of subconscious incubation that suddenly illuminates (the 'Aha' factor) through 'stereo' thinking. By this, I mean the integration of the left hemisphere of the brain (the analytic side) with the right hemisphere (the intuitive side)."

Therefore, Synnott provides a list of 14 initiatives in the realms of education, organization, finance and planning that companies have taken in search of strategic innovations.

After delving into architecture and the need to keep abreast of change, Synnott concludes with a list of 63 different "information weapon strategies." This prosaic finish reflects the volume's tone — a little dry but focused, somewhat plodding but still moving in a clear direction. It's a tone that is not inappropriate for the subject.

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DAVID LUDLUM

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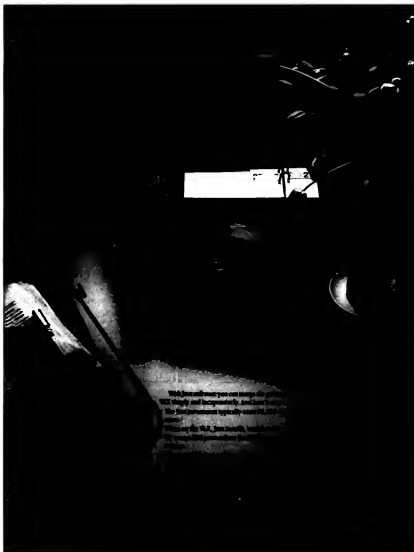
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INDUSTRY INSIGHT

Kathy Porteus

Tomorrow's blue chips?

What's hot in venture capital circles these days may be what azzles on Wall Street and in the computer industry within the next several years. This is a fervent wish of venture capitalists as they search for start-ups with a promising mix of technology and product, market-size potential and management, but leading high-tech venture capital firms exhibit a wide variety of favorite technologies or markets in which to invest.

Floyd Kivimae, partner with Kleiner, Perkins, Caulfield & Byers in San Francisco, says his company's most active areas of investment are optical technology, expert systems, biotechnology, new versions of supercomputers and extensions of desktop computer applications.

On the other hand, Boston-based TA Associates currently favors funding start-ups in non-micro software, medical technology, communications, financial information services and hazardous waste treatment.

Resurgence seen

Andy McLean, a partner with TA Associates, says he suspects there will be a resurgence of venture investment opportunities in microcomputer applications software owing to IBM's Personal System/2.

American Research Development (ARD) in Wellesley, Mass., focuses on funding early-stage development ventures in high-tech ceramics and surface physics. "Whereas the force behind venture funding used to be computer-driven industries, the rest of the decade will be materials plays," says A. Wide Blackman, general partner with ARD.

As a result, the total investment needed to bring a product to market will be much greater. According to Blackman, commercializing products in ceramics requires as much as \$80 million, compared with a total investment of \$18 million in robotics or \$2 million in software.

Crosspoint Venture Partners in Mountain View, Calif., is another source of seed money for companies in emerging technologies. According to Neil Douglas, an associate with

Continued on page 94

Bells await partnership OK

Joint venture stampede seen if court gives holding companies free rein

BY MITCH BETTS

CW STAFF

WASHINGTON, D.C. — Industry analysts predict there will be a flood of joint ventures between the regional Bell holding companies and vendors of electronic mail, videotex and on-line data base services if the Bell companies are allowed to enter the information services market.

A federal court hearing is scheduled this week to hear oral arguments about proposals that would free the regional Bell companies from business restrictions imposed by the AT&T divestiture judgment. A decision on the matter later this year by U.S. District Court Judge Harold H. Greene could influence the shape of the information services industry for years to come.

analysts said.

If permitted, the joint ventures would make use of the Bell companies' local network connections to residences and businesses, offering a transparent conduit for information services.

"Publicly, information companies such as The Dun & Bradstreet Corp. are opposed to entry of the Bell operating companies. But privately, they're ready to cut some deals," said Hanes Gaffner, president of market research firm Link Resources Corp., at a recent conference.

Another example, Rockville, Md.-based electronic mail vendor Dialcom, Inc., is interested in joint ventures with regional Bell holding companies that would boost its volume usage and marketing clout [CW, May

11]. "The Bell companies are good at managing networks, and Dialcom is good at value-added services. There's a lot of synergy to be gained if each of you do what you know how to do well," Dialcom President John Morris said.

Spokesmen for the regional Bell holding companies said they want to provide delivery and support services for the data base services of others.

"Our reasoning is simple said William L. Weiss, chairman and chief executive officer of Chicago-based Ameritech Corp. "The more information services available on the market, the more the local network will be used. And this new usage is potentially a very large source of new revenue for us."

Continued on page 94

Five-year wait for MCC ends

BY ALAN ALPER

8/1/92

NEW YORK — NCR Corp. last week unveiled the first commercial product using technology developed by Microelectronics and Computer Technology Corp. (MCC), the 5-year-old research and development consortium of computer and chip manufacturers in Austin, Texas.

NCR introduced Design Advisor, an expert system used to design application-specific integrated circuits (ASICs). Design Advisor is based on an expert system shell developed under the name Proteus, which was transferred to participating MCC shareholders in April 1985. It runs on a Symbolics Inc. processor, NCR said.

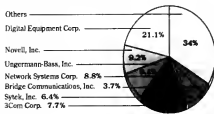
NCR's Microelectronics Division reportedly will offer Design Advisor as a dial-up service to its ASIC customers beginning in September from its Fort Collins, Colo., chip-making facility. Charges for the service start at \$4,000 and will depend on the complexity of the circuits designed and the number of production runs required, according to James Van Tassel, vice-president of the division.

Continued on page 92

Data View

U.S. LAN shares by revenue

Fifty-seven percent of local-area networks shipped in 1986 were Ethernet-based



INFORMATION PROVIDED BY DATASOURCE INC. CW CHART

Delay to cost Maxtor \$20M

BY JAMES A. MARTIN

CW STAFF

SAN JOSE, Calif. — Maxtor Corp. could lose as much as \$20 million in revenue this year as a result of difficulties in obtaining what the firm called a critical component for its 3½-in. 380-Mb and 760-Mb hard disk drives.

Although Maxtor officials would not identify the component, Read-Rite Corp. in Milpitas, Calif., said it was experiencing delays in shipping the head component to manufacturers of

Continued on page 93

Chips & Technologies tackles PS/2

BY JAMES A. MARTIN

CW STAFF

MILPITAS, Calif. — Chips & Technologies, Inc. rode high on the first wave of popularity for the low-priced IBM Personal Computer AT compatibles, supplying low-priced chip sets to the clone and compatible vendors. The new wave, the Personal System/2, is now here, and Chips & Technologies fully expects to be on top of this one, too. This time around, however, the company is going to find it a bit more difficult.

Reverse engineering the PS/2 Model 50, 60 and 80 is the prime concern at Chips & Tech-

nologies [CW, June 22]. Engineers are studying the microcomputer's major circuits to determine their relationship to IBM's proprietary Micro Channel architecture and to analyze the logic functions of the chips. It is a costly and time-consuming effort, said Gordon A. Campbell, president and chief executive officer, in a recent interview at corporate headquarters.

"We're trying to understand what IBM did, and to reverse engineer the PS/2 is only a small part," he said. "We need to understand the system's board architecture and its interaction with the [IBM] BIOS, what the Micro Channel is and its impact



Gordon Campbell

on the overall architecture. There are 15 to 20 custom chips in the new IBM line, and it will cost us about \$1 million per chip

to understand it all."

Campbell said he expects PS/2 compatibility to be available in the first quarter of 1988 although a Model 30-compatible chip set — based on the older PC AT bus structure — will be ready later this year.

Chips & Technologies, founded in December 1984 with four employees, has grown rapidly into a 138-employee public company and is the leading supplier of very large-scale integrated circuit chip set technologies for AT compatibles. Among its customers are Zenith Data Systems, NEC Corp., Tandy Corp., AST Research, Inc. and Quadram Corp.

Revenue for fiscal 1987 is expected to be \$80 million after

Continued on page 93

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MCC constructs flexible architectures program

AUSTIN, Texas — Microelectronics and Computer Technology Corp. (MCC) said it will restructure its computer architectures program to provide more flexibility for its 20-shareholder firms.

Previously, the Advanced Computer Architectures (ACA) program consisted of four separate projects, shareholders participating in the ACA programs were required to join all four. Current participants are Bell Communications Research Corp., Control Data Corp., East-

man Kodak Co., Digital Equipment Corp., Harris Corp., Honeywell, Inc., NCR Corp. and Unisys Corp.

Under the restructuring, ACA participants must take part in the core research and at least one of three laboratories: the Human Interface Laboratory, the Artificial Intelligence Laboratory and the Systems Technology Laboratory.

Eugene I. Lowenthal has been named vice-president and ACA program direc-

tor. Lowenthal, who for 13 years held positions at Intel Corp. as well as MRI Systems Corp., most recently held the position of vice-president and program director of the data base program at MCC.

The ACA program's requirements are changing as research progresses, according to Joseph Boyd, chairman of the board of Harris Corp. and MCC's interim chairman and chief executive officer. MCC also recently announced that it

is in the initial stages of launching a program to study the application of superconductive materials to electronics. That program is expected to begin late this year.

The superconductivity project will be directed by Barry Whalen, vice-president and program director of MCC's Packaging Interconnect Program, and Harry Kroger, MCC's technical director.

ALAN J. RYAN

MCC

CONTINUED FROM PAGE 79

Van Tassel said Design Advisor is the first chip-design tool to use expert systems technology. It should reduce the time to market of computers using ASICs from 24 to six months and decrease design costs of those systems by about 20%, he noted. Approximately 55% of NCR's semiconductor business was derived from ASIC designs last year, a figure Van Tassel said should increase to more than 70% by 1990.

Grant Dove, MCC's chairman-elect, said NCR's Design Advisor is the first of a number of products expected to be unveiled by consortium members during the next year. Boeing Co., he said, is expected to use circuit packaging and interconnect technology developed through its participation in MCC for its next-generation 787 airliner. Despite earlier skepticism about the ability of U.S. companies to cooperate on R&D, Dove said the benefits of MCC are beginning to be realized.

"A company which invests in MCC is part of an effort several times larger than its share of the investment it could fund alone," Dove said. "In return for that highly leveraged investment a company is able to tackle projects which, because of complex technological problems or a shortage of talent, often could not or would not be funded."

Cooperative research pays

Guest speaker U.S. Secretary of Commerce Malcolm Baldrige said NCR's product announcement symbolized the importance of cooperative research in allowing domestic companies to retain their competitive edge in the international computer industry.

"Projects like this prove we're back on track to improve our competitiveness," Baldrige said, citing the slight reduction in the U.S. trade deficit and increase in exports as other examples.

Analysts, however, said the commercialization of MCC technology by NCR was not necessarily indicative of a development that would help domestic firms maintain their competitive edge. Computer-aided design tools for chips are already on the market, they pointed out, while expert systems technology has been commercialized in a number of other markets such as financial services and medical equipment.

"This is a first step," said Uline Weil, a Washington, D.C. independent consultant associated with the Gartner Group, Inc. "The baby has to learn to walk before it can run."

High Tech Advertising. When the

COLUMBUS, OHIO • 9:35 A.M.

After three years of development, the PC-based financial planning product of a multinational U.S. company is ready to be marketed in Western Europe and the Pacific Basin.

With a limited budget, the marketing director needs to develop an advertising plan that delivers maximum impact in targeted international markets. First, he needs to know his best prospects, then, how they view his company's products, and finally, what competition he will face.

His solution: Call International Data Group.



FRAMINGHAM, MASSACHUSETTS • 9:45 A.M.

The marketing director calls Frank Cutitta, director of IDG Communications International Marketing Services.

Cutitta decides that initial research is needed. He immediately contacts Mike Raimondi, director of Database Services for International Data Corporation's Global Data Resources.

Cutitta and Raimondi map out a comprehensive QuikSurv telephone survey which will poll both MIS professionals responsible for selecting and purchasing similar products in large corporations, and PC end-users who will actually use the product in Europe and Asia.

The marketing director authorizes the study.

E-Mail assignments are quickly sent to IDG's international offices in London, Paris, Munich and Sydney.



SYDNEY, AUSTRALIA • 11:30 A.M.

Cutitta discovers strong competition in Australia where similar but lower-level PC-based financial products are already on the market. He contacts Alan Power, vice president of IDG Communications' Pacific Region and general manager of Computerworld Australia.

Power recommends a two-tier advertising campaign highlighting the product's technical breakthroughs, and stressing the program's ease-of-use and strong local sales support.



LONDON, ENGLAND • 2:00 P.M.

At the request of Cutitta, Philip de Marillac, director of IDG's European Research Center, prepares a forecast of PC-based financial planning product sales to provide critical information as the team determines how to best reach key corporate targets.



Maxtor

CONTINUED FROM PAGE 79

thin-film media hard disk drives. The company identified Maxtor and Headtek-Packard Co. as users of their product.

The component delays could seriously hurt Maxtor, according to David Vellante, a data storage analyst for International Data Corp. in Framingham, Mass.

"There's no real short-term solution to this problem for Maxtor," he said. "They have to dig a trench and wait it out, and it could cost them \$10 million or \$20 million this year, maybe more. There aren't a lot of suppliers out there with the same thin-film head product that have the same good economy of scale that Read-

Rite does, and it's a tough product to get hold of."

An HP spokesman said the delays will not affect any of its computer shipments, as the thin-film heads were purchased for hard disks in workstation and minicomputer products under development.

Maxtor spokesman William Dobbin admitted that the shipment delays will have an unfavorable impact on Maxtor's financial results for the quarter ended June 28.

Manufacturing of Maxtor's Series 8000 and 4000 hard disk drives will be reduced but not discontinued as a result, even though other component sources for the product are available, Dobbin added.

Maxtor would not name customers of its hard-disk products. Some observers said they believe Sun Microsystems, Inc.

and Apollo Computer, Inc. buy Maxtor hard disks on an OEM basis for various workstations.

It could not be confirmed, however, whether those companies purchase the two hard disk drive series affected by the manufacturing delays.

Read-Rite President Wade Meyercoed said his firm's shipping delays resulted when one of its suppliers discontinued a component used by Read-Rite in manufacturing its thin-film heads.

Read-Rite was forced to make changes in its manufacturing process to accommodate an alternative part for the head, which caused production to drop from 4,000 heads per day to 2,000. The problem is only a temporary one and production is ramping back up, Meyercoed said.

Tackling PS/2

CONTINUED FROM PAGE 79

only one full year of product shipments. Net income is anticipated at \$13 million. For fiscal 1988, some analysts are predicting sales of \$120 million or more.

But the firm could well be at a turning point. In addition to IBM's new technology, the challenge this time will be the expected increase in competition in the PS/2-compatible market, analysts said.

"Has the lion's share"

"Right now, Chips has the lion's share of its market, but IBM's new products open up a new architecture and suddenly there will be a lot of competitors waiting in the wings," according to Drew Peck, a semiconductor analyst for Donaldson, Lufkin & Jenrette, Inc. in New York.

VLSI Technology, Inc. in San Jose, Calif., is seen as a competitive threat to Chips & Technologies. VLSI Technology recently introduced an AT-compatible chip set and is said to be reverse engineering the PS/2 architecture as well.

Although other companies like Western Digital Industries Corp. and Zynus Corp. compete in the systems logic marketplace, we believe the VLSI Technology AT-compatible product is Chips' most serious competitive challenge to date." Edward C. White Jr., an E.F. Hutton & Co. analyst, wrote in a recent report on the electronics industry.

Chips & Technologies is relatively unconcerned with increasing competitive pressures. "We were the first company that identified the fact that the IBM standard would grow into such high volume and we used ASIC (application-specific integrated circuit) technology early on to make a better-built PC architecture," Campbell said. As a result, the company said it believes it is entering the PS/2 compatibility race with a stronger foundation.

Another advantage to help attack the PS/2 chip and BIOS logs is Campbell said is the company's informal working relationship with Norwood, Mass.-based Phoenix Technologies Ltd., a leading BIOS software supplier to PC-compatible manufacturers. Both companies have many of the same customers, Campbell said, and a relationship developed. There are no plans for a merger or formal joint venture partnership, he said.

Licensing agreements with IBM are not a concern, Campbell said, because the company is not selling an exact duplication of IBM technology but a compatible enhancement of it. As for acceptance of the PS/2, Campbell said he is confident that the new IBM machines will become the standard within one or two years.

Perhaps analysts' greatest concern for the new company's future is the need to diversify. "They must not be entirely dependent on the PC market and the IBM PC and PS/2 compatible market in specific," Peck said. "It's too volatile."

Chips & Technologies has already entered the communications market with an AT&T Starlan-compatible chip set. In the graphics market, the company recently introduced the IBM-compatible Sharp-Link Enhanced Graphics Adapter (EGA), a chip set that the company claims can improve EGA resolution to 300.

"They may have a lot of competition soon, but Chips & Technologies' design expertise is second to none," Peck said. "They will be a hard act to follow."

World is bigger than your budget.

FRAMINGHAM, MASSACHUSETTS • 4:30 P.M.

Cuttitta and Ramondini meet with IDC's QuidSurv's Ken McPherson and Judy Danelson to discuss the survey findings. Sheryl Merchant, IDG Communications International Marketing Services sales and marketing support manager, uses IDG's global E-mail Network to check foreign currency exchange rates and closing dates for all international magazines.



UNITED STATES, EUROPE, ASIA • 4:45 P.M.

Cuttitta initiates a global conference call to review final recommendations with IDC's regional offices in Sydney, London, Hong Kong and Framingham. His plan is to target MIS professionals by using Computerworld Australia, Computerworld Asia, Computerwoche, Computerworld Italia and Computer News in England. The PC end-user campaign will stress product documentation, reliability and service, and break in PC World editions in England, France, Germany and Australia.



COLUMBUS, OHIO • 5:30 P.M.

The marketing director accepts the IDG recommendation and notes that the media plan prepared by IDG will penetrate all target markets within budget restrictions. He gives Cuttitta a final commitment for advertising space in the selected IDG magazines. All the ads will be placed centrally through IDG/IMS in the U.S.

His new product campaign will break in three weeks.



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Blue chips

CONTINUED FROM PAGE 79

Crosspoint, ventures that propose to solve a significant problem in the marketplace represent the best investment opportunities. Crosspoint's investment portfolio currently includes ventures that address the I/O bottleneck, software development productivity, the integration of dissimilar devices or software and the improvement of computer performance along with software migration.

Norwest Venture Capital Management, Inc. in Minneapolis says it favors financing ventures with the potential of significantly affecting user productivity. Among Norwest's portfolio of 100 com-

panies are software code-generator and silicon compiler firms.

Unlike most venture capital firms, high-tech venture capital leader Hambrecht & Quist Venture Partners aggressively invests in turnaround situations. Hambrecht & Quist is also actively financing start-up ventures in medical technology, semiconductor design and production and software.

But venture capital firms often give greater consideration to a start-up management team than its technology, according to several recently funded companies. An example is Dana Computer, Inc. in Sunnyvale, Calif., founded in late 1985 by Allen Michels of Convergent Technologies, Inc. "We had to turn down a lot of people who wanted to invest," says

Steve Blank, Dana's vice-president of marketing.

However, most start-ups do not have such well-known names at the helm. Jack Hugs, president and chief executive officer of Scientific Computer Systems, a San Diego-based maker of Cray Research, Inc.-compatible near-supercomputers, says there was a conscious decision to assemble a mature management team to enhance the firm's chances for success.

Quality of team top priority

According to Scott Gibson, chief operating officer and a founder of minisupercomputer maker Sequent Computer Systems, Inc. in Beaverton, Ore., the quality of people accounts for the first five of eight reasons that venture capitalists de-

cide to invest in a start-up.

Gibson says the fact that Sequent's initial team of 18 had supported the company without pay for several months demonstrates the kind of management commitment that attracts sophisticated investors. Sequent recently issued a successful initial public offering.

So while looking at the hot spots attracting venture money, one should remember the adage, "Chances of success are greater with good management and a mediocre product than with a great product and mediocre management."

Portico is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Bells

CONTINUED FROM PAGE 79

The Justice Department supports removal of the restriction on offering information services, arguing that it prevents the public from obtaining the benefits of information technologies. The department said anticompetitive behavior by the Bell companies would be held in check by the Federal Communications Commission's policy on Open Network Architecture (ONA).

Under ONA, the Bell companies must offer competing information service providers equal access to the local network. Many existing information service vendors say ONA is an untested concept that will not be operational for several years.

According to Alan Pearce, president of Information Age Economics, Inc., a policy analysis and consulting firm in Bethesda, Md., Greene probably will not give the Bell companies permission to enter all of the information services market because ONA has not yet been implemented.

But Pearce said Greene may permit the Bell companies "to get their foot in the door" on an experimental basis. He said they may be allowed to offer voice-message-store-and-forward service and firm joint ventures with electronic mail, videotex and on-line data services in which the Bell company would act as a transmission service but would not control the content of the service.

Bernell Wright, an analyst with Link Resources, predicted that videotex will not be a successful business until the Bell companies are allowed to enter the business and form partnerships with struggling vendors.

While the videotex industry supports the entry of the Bell companies into information services, other trade groups are worried about potential anticompetitive behavior by the telephone companies.

The Information Industry Association, in its written comment to Judge Greene, opposed the Justice Department's proposal to remove the restriction on information services as premature. But the association added that once certain safeguards are in place, a Bell operating company should be allowed to seek a waiver so it can "provide network-enhancing information services that do not amount to electronic publishing."

AIAPS, an inter-trade association representing information service providers, also opposed relief for the Bell companies unless the court requires them to offer information services through separate subsidiaries.



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EMPLOYMENT TODAY

City hall opportunities abound

MIS is no longer the poor relation in state and municipal government

By MICHAEL BALL
SPECIAL WRITER



Once the least appreciated and most neglected area of state and local government, data processing now is receiving increased attention from administrators and politicians.

Because they want to use the benefits of automation to reduce expenses and demonstrate their support of technology, government officials are more willing to finance DP than ever before.

This attitude is responsible for a number of trends that create opportunities for DP professionals, including the following:

- States spend an estimated \$3 billion annually on information systems, accounting for 8.8% of total state expenditures. Thirty-seven percent of information systems expenditures pay for personnel, according to the National Association for State Information Systems (NASIS).
- A number of states increased the number of personal computers installed in their DP departments by anywhere from 300% to 500% between 1979 to 1983, according to NASIS.
- Cities with populations of more than 10,000 spend 1.5% of their annual budgets on information

systems, and total municipal information system spending is expected to reach \$6 billion by 1990, according to the University of California's Public Policy Research Organization (PPRO).

• By 1990, 99% of those cities will install some type of computer system, and half of them will establish independent DP departments, according to PPRO.

• PPRO estimates that by 1990, 50% of the cities will rely on multiple computer installations, including departmental systems in police, public works and utilities operations.

User departments grow

While positions are being added to traditional central MIS departments in large city and state governments, the fastest growing area is user departments. A recent PPRO study shows that the number of computing personnel employed by city user departments will equal the number employed by computing departments by 1990. Opportunities are being created in user departments because of increased end-user computing, the installation of departmental systems and the delegation of data entry tasks to department staffs.

Another area receiving increased attention is MIS salaries. Notorious for underpaying computer professionals, most

state and local governments pay their staffs less than what these personnel would receive in the private sector. But some states are taking steps to change this inequity.

Massachusetts, for example, spends \$40 million annually on information systems and recently enacted a Technical Pay Law

Job trends

Demand for DP staff is growing fast in local government user departments



to address concerns about MIS salaries. The law created four broad classes of MIS employees with specific pay levels. Prior to the law, MIS employees were included in civil service categories that mandated lower pay restrictions. The state now attracts the best candidates by offering higher salaries, says Patricia Wada,

who heads the bureau of systems policy and planning.

Currently, 230 workers with 18 civil service titles are employed under the law, according to Mark Greeley, assistant director of MIS human resources. He notes that the workers must maintain their productivity based on an annual review to keep the higher salary. The program is attracting attention from outside Massachusetts. "A number of states have contacted us to see how it works. They say they're thinking about implementing one like it," Greeley says.

Staffing requirements for government MIS departments vary according to the needs of the city or state. In addition, the smaller city departments offer more variety than large state operations. Boston's DP department, for example, hires generalists who are comfortable with diversity, says Allen Stern, chief of Boston's DP unit.

While Wada demands more specific skills, "We have a lot of demand for people with [local-area network] technology experience and those who have been a systems administrator," she says. Another trend affecting MIS workers in state and local governments is the need for justifying expenditures. Budget limitations require cutbacks in government services are placing pres-

sure on managers to implement cost-effective systems.

Jeff Denning, director of management systems in Scottsdale, Ariz., runs a 3-year-old shop with 420 Unisys Corp. terminals.

Hard sell, soft sell

"The first system justification was hard," he says. "But what I tell other cities is that convincing the government to buy the system means both hard selling and soft selling."

Denning is quick to add that the soft sell is easier. "I ask some direct questions," he says. "What's it worth if you can make a decision faster or if the city council can communicate faster and the people feel the city is more responsive to their needs?"

Denning claims his systems provide \$3.5 million in net benefits to Scottsdale each year. Many of the benefits have come from cost avoidance, such as not having to hire additional workers and managers. Despite the budget pressure, Denning says he prefers government work to private industry. "In a private firm, people always seem to think out strategies from a political point of view," he says.

"Here, we're in a fish bowl and can't do that. The constant demand is, 'Prove to us you know you're doing the right thing.' City jobs tend to keep you very objective," he adds.

Ball is a free-lance writer based in Boston.

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This individual will participate in the development, evaluation, monitoring, and administration of data security policies and procedures for the purpose of ensuring integrity, appropriate accessibility, and reconstruction of software and data maintained on the AAI computer network. Further duties will involve disaster recovery plans, support and consultation for local user support administrators in the administration of RACF on TSO, develop and present educational programs on data security, and the evaluation and selection of software products for data security.

You must have a minimum of four years' current experience in Data Security on large scale IBM distributed processing systems, working knowledge of Data Security, Disaster recovery and Database Security. Experience in TSO, RACF and JCL required.

Both positions also require a Bachelor's degree in Computer Science or related field, 8+ years' experience in information services.

ARCO Alaska, Inc. offers a fully competitive commensurate salary and a comprehensive benefits package. For prompt and confidential consideration send your resume and salary history to: Employee Relations-ATC 886, ARCO Alaska, Inc. PO Box 100360 Anchorage AK 99510-0360.

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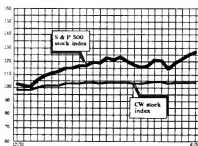
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Software & DP Services

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Leasing Companies

Year	Number of People
1971	85
1972	105
1973	125
1974	135

Apple tools step up Mac attack

BY ALAN RYAN
LA 5787

WASHINGTON, D.C. — Apple Computer, Inc. groused headlong into the engineering, architecture and design field at the A/E/C Systems '87 show last week, when the firm displayed more than 20 hardware and software products from developers for use on its Macintosh personal computer family.

However, computer-aided design software leader Autodesk, Inc. said it currently has no plans to port its software for the Macintosh.

More than 22,000 attendees were registered for the A/E/C confab and its concurrent shows by mid-week, and some 412 exhibitors filled 110,000 square feet of floor space available, according to the principals of Design '87, the International High Technology Design and Construction Fair, which encompasses A/E/C Systems.

Ken Tashiro, a product man-

ager at Fujitsu America, Inc., estimated that the audience was split evenly among automated firms seeking information on the latest product entries into the field and nonusers interested in automation.

Bill Clark, owner of Beltway Surveys in Camp Springs, Md., said he attended the show to examine surveying packages. "As our business grows, we feel we need to get into computers."

Products highlighting the show included Apple third-party software products from Challenger Software Corp., Data Tutor, Inc., Erez Anal Software, Visual Information, Inc., Versatec, Inc., Advent, IDD, Inc. and others. Hewlett-Packard Co. demonstrated its plotters for use with the Macintosh IIe and the Macintosh SE PCs. Michael Homer, Apple's manager of business development, contended that the company's participation in shows like A/E/C Systems demonstrates that the Macintosh provides solutions for engi-

neers and scientists.

But Eric Lyons, director of technology at Autodesk, said that while his company is interested in having the general-purpose design and drafting software, Autodesk, run in any hardware platform that they sell. "We haven't yet seen that with the Macintosh. We are watching [the Macintosh] closely, as we do with all hardware platforms."

Other products announced at the show included an enhanced-facilities management software package from Prime Computer, Inc. Expanded FM Plus 3.0, based on Prime information data management environment software, FM Plus features four modules addressing the planning, management and analysis needs of facilities managers and designers. FM Plus operates on all terminals that support Graphical Kernel System and will sell for \$20,000 for the base module on a small system to \$60,000 for the complete module on a high-end system.

PC products beat drum in A/E/C introduction parade

WASHINGTON, D.C. — Products announced at last week's A/E/C Systems '87 included a bevy of products designed to work with personal computers.

Fujitsu America, Inc.'s Information Systems Division last week unveiled its Engineering Library for Modeling (ELM) for structural-engineering analysis. The three-dimensional finite-element analysis package reportedly enables engineers to test their structural designs for strength and safety.

The package includes the interactive 3-D finite-element analysis preprocessor ELM-prelude, ELManalysis for structural engineering and a graphics postprocessor ELMplot, and sells for \$3,990.

Logographics introduced Concept 3D, a design package running on the company's RGS Graphics Subsystems for the IBM Personal Computer. It sells for \$4,000.

Programs announced to work with Autodesk, Inc.'s AutoCAD package included Text Master from Mid-Cad, Inc., a text management program designed to enhance the text-manipulation capabilities of AutoCAD. It displays files onto AutoCAD's screen menu and sells for \$70.

St. Paul, Minn.-based Control Systems, Inc. announced its Art 10GT and Artist 1016 GT. The sets were designed to work with AutoCAD and reportedly will retail for between \$3,195 and \$3,695.

Sigma Design, Inc. introduced Release 3.5 of its Unibase software for architectural and building design and management professionals. The company also has retained its software family to Arms 5.3, incorporates a new user interface and space planning application. It is available now; prices start at \$3,000.

ALAN RYAN

Microsoft

FROM PAGE 1

this [to combat the chairman]," said Andrew Seybold, chief executive of The Seybold Group, Inc., a market research firm in Torrance, Calif.

A more detailed look at the LAN Manager reportedly will be revealed tomorrow. "There's still more code to come," said Steve Balmer, Microsoft's vice-president of system software.

"As part of a more full commitment, [3Com] will really work with us as a hardware vendor in a very significant way," Balmer said.

In addition, 3Com is set to distribute the LAN Manager through its dealer force, while Microsoft is to handle OEM sales. The agreement provides 3Com with an equal share in revenue derived from LAN Manager sales, sources said.

"We expect Microsoft will either let 3Com be the exclusive distributor of product for a while,

or [let the company resell] an exclusive 3Com version," said Thomas White, president of The Seybold Group, who works out of the firm's San Jose, Calif., office.

3Com is expected to bundle a new version of its 3+ software incorporating the LAN Manager with some of its hardware — most likely the 3Server3 file server — for sale to end users, sources said. OS/2 on the server side will allow single-user applications to be loaded into the server and distributed across the network.

Whereas previously, 3Com only used the redirector portion of MS-Net for 3+, the company said it now plans to take advantage of much more in the LAN Manager. For example, the company will incorporate into 3+ an improved filing system that is compatible with OS/2, said Wes Raffel, director of marketing for 3Com's Software Division. "This means we can add value in [new ways], such as through personal communications applica-

tions or applications that only make sense on networks," he said.

This will provide 3Com with a unique advantage in the trenches because Novell's chances of emulating the core product, the LAN Manager, are slim, Raffel said.

Further, the vendors intend to position the LAN Manager as the core networking standard for the future, regardless of what IBM does. Raffel said. Industry analysts said the move specifically targets Provo, Utah-based Novell, whose products are the current de facto standard in IBM Personal Computer-compatible networking.

Unlike 3Com, Novell does not incorporate MS-Net's redirector, choosing to emulate it instead. However, analysts said, it will be extremely difficult for Novell to emulate the LAN Manager, which incorporates 10 to 15 times the code required for MS-Net.

"Novell does have a more formidable technical task ahead of

them," said Paul Schier, a network analyst with Robertson, Coleman & Stevens in San Francisco.

Raffel said Craig Burton, Novell's vice-president of corporate marketing, spoke at a seminar last week and indicated his company will emulate OS/2 on the workstation side, interfacing to Novell's Advanced Network software on the server and "totally bypassing

the LAN Manager."

Third-party vendors currently are selling networks with their network hardware will also be affected, analysts said. These vendors will have to either take the risk and expense of converting their product lines and installed bases over to the OS/2-based LAN Manager or take a chance that Novell will remain on top in the network wars and stick with Netware.

Coming soon

In a series of interviews last week, 3Com Corp. officials unveiled a rough sketch of their product plans through 1988.

3Com is set to release three major products between July and year's end.

• **3+ for the Apple Computer.** Inc. Macintosh is set to ship on July 30. Loaded onto a 3Com 3Server3 file server, it is intended to allow Macintoshes and IBM Personal Computers to share and access files and to let them share and access Adobe Systems, Inc. Postscript-compatible printers and Apple Laserwriters (CW, May 18).

• **"Troquos,"** the code name for 3Com's 10M-bit Ethernet network running over fiber-optic cable, will probably ship by the end of August. The product is already being shown in field demonstrations and at selected customer sites. A prototype system is in

place at 3Com that uses Northern Telecom, Inc.'s Meridian private-branch exchange.

• A version of 3+ network software for machines based on the Intel Corp. 60386 chip is slated to ship before the end of the year. Only minor changes are involved, including alterations that will let 3+ take advantage of the 386's 32-bit memory.

Users who want to run Microsoft Corp.'s Operating System 2 LAN Manager will need 3Com's 386-based server, which is also slated for release by year's end.

Next year, 3Com will definitely ship a version of 3+ that is compatible with Microsoft's Windows, said Wes Raffel, director of marketing for 3Com's Software Division. That release will reportedly be followed by an OS/2 version of 3+.

PATRICIA KEEFE

Syntelligence preps expert system advisor

BY ED SCANNELL
and CHARLES BABCOCK
CH 5787

SUNNYVALE, Calif. — An expert system designed to provide loan-officer advice will become available as a commercial product next month.

The expert system, The Lending Advisor from Syntelligence, Inc. in Sunnyvale, was developed using the expertise of loan officers at Wells Fargo Bank

NA in San Francisco and Wachovia First Bank and Trust Co. in Winston-Salem, N.C., according to Syntelligence President Sheldon Brenner.

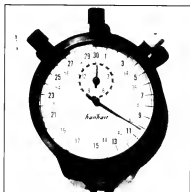
The product is priced from \$500,000 to \$1.5 million, depending on the number of workstation users. It runs on an IBM mainframe as a CICS application under MVS/XX.

An end-user workstation interface runs on IBM Personal Computer ATs and is reportedly

based to the mainframe product through 3270 terminal emulation boards.

Loan officers can enter information about a prospect and engage in a dialogue with the system over what type of credit risk is having the general purpose, Release 2.0 of The Lending Advisor is scheduled to be available Wednesday and will include a "Show Reasoning" feature that displays the reasoning behind an assessment, Brenner said.

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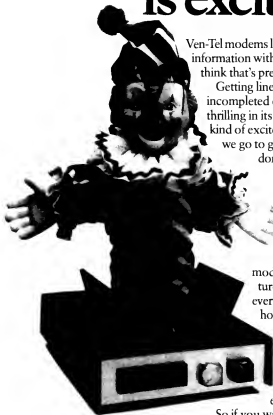
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